

*Virginia  
Ambient Air Monitoring  
2003 Data Report*



*Department of Environmental Quality*

*Commonwealth of Virginia*  
*Department of Environmental Quality*



*Submitted by*  
*Office of Air Quality Monitoring*

**This Ambient Air Monitoring Data Report is for the time period  
of January 1, 2003 to December 31, 2003**

**On The Cover**

**Peaks of Otter, located in Bedford, Virginia  
on the Blue Ridge Parkway  
Photograph courtesy of Tom Jennings**

**Robert G. Burnley, Director  
Virginia Department of Environmental Quality**

**John M. Daniel, Jr.  
Director, Air Division**

**James E. Sydnor  
Director, Office of Air Quality Planning & Monitoring**

**2003 Annual Report prepared by:  
Crystal Sorensen, Statistical Analyst**

**Acknowledgments:**

**Thanks to John M. Daniel, Jr., James E. Sydnor, James Dinh, Tom  
Jennings, Carolyn Stevens, Dan Salkovitz, Baxter Gilley and Charles  
(Brian) King.**

Published, September 2004

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Department of Environmental Quality  
Office of Air Quality Monitoring  
4949-C Cox Road  
Glen Allen, VA 23060

Fax: (804) 527-5160  
E-mail: [cysorensen@deq.virginia.gov](mailto:cysorensen@deq.virginia.gov)



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# COMMONWEALTH of VIRGINIA

## DEPARTMENT OF ENVIRONMENTAL QUALITY

Street address: 629 East Main Street, Richmond, Virginia 23219

Mailing address: P.O. Box 10009, Richmond, Virginia 23240

Fax (804) 698-4500 TDD (804) 698-4021

[www.deq.state.va.us](http://www.deq.state.va.us)

W. Tayloe Murphy, Jr.  
Secretary of Natural Resources

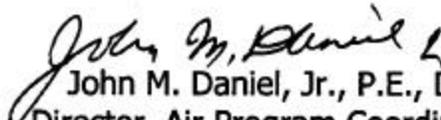
Robert G. Burnley  
Director

(804) 698-4000  
1-800-592-5482

July 29, 2004

### **CERTIFICATION**

Air quality data reported by the Virginia Department of Environmental Quality are collected using EPA certified equipment and procedures at sites meeting EPA siting criteria. The data summarized in this report for calendar year 2003 are accurate to the best of my knowledge.

  
John M. Daniel, Jr., P.E., DEE  
Director, Air Program Coordination



# FAIRFAX COUNTY

## DEPARTMENT OF HEALTH

Division of Environmental Health  
10777 Main Street, Suite 203  
Fairfax, Virginia 22030-6903

Telephone: (703) 246-2205 Fax: (703) 273-0825

---

TDD: (703) 591-6435

July 30, 2004

### CERTIFICATION

The Fairfax County Air Quality Monitoring Program's portion of the air quality data that is reported by the Virginia Department of Environmental Quality was collected using EPA certified equipment and procedures at sites that meet EPA siting criteria. The data summarized in this report for calendar year 2003 are accurate to the best of my knowledge.

Glenn Smith  
Program Manager



*City of Alexandria, Virginia*



DEPARTMENT OF TRANSPORTATION  
AND ENVIRONMENTAL SERVICES

301 King Street  
Suite 3900  
Alexandria, Virginia

Richard J. Baier, P.E.  
Director, T&ES

Telephone: (703) 838-4966  
Fax: (703) 519-3356

William J. Skrabak  
Chief, Division of Environmental Quality

Telephone: (703) 838-4334  
Fax: (703) 519-5941

**CERTIFICATION**

That portion of the Virginia air quality data collected by the City of Alexandria Transportation and Environmental Services Division of Environmental Quality are collected using EPA certified equipment and procedures at sites meeting EPA siting criteria. The data submitted and summarized in this report for calendar year 2003 are accurate to the best of my knowledge.

August 2004

*Ken Whitlock*

Ken Whitlock  
Environmental Specialist  
Division of Environmental Quality  
City of Alexandria Transportation and  
Environmental Services

## **ABBREVIATION TABLE**

<b>#N</b>	Number of Samples
<b>AQA</b>	Air Quality Assessment
<b>AQCR</b>	Air Quality Control Region
<b>ARITH.</b>	Arithmetic
<b>ATMN</b>	Air Toxics Monitoring Network
<b>CAS RN</b> <b>(CM)</b>	Chemical Abstracts Service Registered Number Continuous Monitor
<b>CO</b>	Carbon Monoxide
<b>CONC</b>	Concentrations
<b>DEQ</b>	Department of Environmental Quality
<b>DISC</b>	Discontinued
<b>EPA</b>	Environmental Protection Agency
<b>GC/MSD</b>	Gas Chromatograph/Mass Spectrometry Detector
<b>GC/FID</b>	Gas Chromatograph/Flame Ionization Detector
<b>IMPROVE</b>	Interagency Monitoring of Protected Visual Environments
<b>LAT</b>	Latitude
<b>LONG</b>	Longitude
<b>Met.</b>	Meteorological Instrumentation
<b>MSA</b>	Metropolitan Statistical Area
<b>NA</b>	Not Available
<b>NAAQS</b>	National Ambient Air Quality Standards
<b>NAMS</b>	National Air Monitoring Station(s)
<b>NMOC</b>	Non-Methane Organic Compounds
<b>NO<sub>2</sub></b>	Nitrogen Dioxide
<b>NQA</b>	Not Quality Assured
<b>OBS.</b>	Observations
<b>O<sub>3</sub></b>	Ozone
<b>PAMHC</b>	Total PAMS Hydrocarbon
<b>PAMS</b>	Photochemical Assessment Monitoring Station
<b>PM<sub>10</sub></b>	Particulate Matter with an aerodynamic diameter less than or equal to 10 microns
<b>PM<sub>2.5</sub></b>	Particulate Matter with an aerodynamic diameter less than or equal to 2.5 microns
<b>POLLUT.</b>	Pollutant
<b>ppbC</b>	Part Per Billion of Carbon
<b>ppbv</b>	Part Per Billion of Volume
<b>ppm</b>	Part Per Million
<b>SEC.STD.</b>	Secondary Standard
<b>SLAMS</b>	State and Local Air Monitoring Station(s)
<b>SO<sub>2</sub></b>	Sulfur Dioxide
<b>SPM</b>	Special Purpose Monitor
<b>STD</b>	Standard
<b>TERM</b>	Terminated
<b>TNMOC</b>	Total Nonmethane Organic Compound
<b>ug/m<sub>3</sub></b>	Micrograms per cubic meter
<b>VOC</b>	Volatile Organic Compounds

## Introduction

The 2003 Virginia Ambient Air Monitoring Data Report is a compilation of air pollutant measurements made by the Virginia Department of Environmental Quality, the City of Alexandria, and Fairfax County. This report satisfies the requirements of the U.S. Environmental Protection Agency (EPA) for the reporting of air quality data as specified in the Code of Federal Regulations, Title 40, Part 58, Appendix F.

Ambient air quality was measured at 51 locations within the Commonwealth during 2003. These monitoring sites were established in accordance with EPA's siting criteria contained in 40 CFR Part 58, Appendices D and E, and monitoring network operations conformed to EPA guidance documents and generally accepted air quality monitoring practices. All data reported for these monitoring sites were quality assured in accordance with requirements contained in 40 CFR Part 58, Appendix A.

Ambient concentrations of carbon monoxide, nitrogen dioxide, and sulfur dioxide continue to meet the EPA's National Ambient Air Quality Standards (NAAQS) during 2003. Although 2003 saw fewer days above the ozone standards than the previous year, Virginia continues to experience problems with summertime ozone pollution, particularly in Northern Virginia, Richmond, and Hampton Roads. In 2003, Northern Virginia had two days when a one-hour ozone average greater than .12 ppm was recorded at one or more monitoring stations in the area. Richmond and Hampton Roads each had one day greater than .12 ppm.

On April 15, 2004, the EPA designated the areas in the country that are not meeting the NAAQS for the 8-hour ozone standard based on ozone measurements during 2001-2003. Included in the list of areas designated nonattainment were the following areas of Virginia: Northern Virginia, Fredericksburg, portions of Shenandoah National Park, Richmond-Petersburg, and Hampton Roads. In addition, two areas that are currently not meeting the standard, but which have entered into Early Action Compacts (EACs) are Winchester and Roanoke. EACs require air quality plans that are designed to reduce ozone precursor pollutants, improve air quality and potentially prevent an area receiving an official nonattainment designation by EPA.

Virginia is meeting the NAAQS for both PM<sub>10</sub> (particulate matter with an aerodynamic diameter equal to or less than 10 microns) and PM<sub>2.5</sub> (fine particulate matter). In February 2004, Virginia submitted its recommended boundaries for PM<sub>2.5</sub> attainment and nonattainment areas, as required by EPA. Since there were no areas of the state exceeding the NAAQS for particulate matter for the years 2001-2003, Virginia recommended that all areas of the state be designated attainment with the particulate matter standards. In June 2004, EPA responded to the state's recommendations with a letter announcing its intention to include the Northern Virginia area on the list of nonattainment areas for PM<sub>2.5</sub>. On September 1, 2004, Virginia again recommended to EPA that Northern Virginia not be designated nonattainment for PM<sub>2.5</sub> for the same reasons set forth in the February letter. EPA plans to make its final designations in November 2004.

<b>AREAS THAT HAVE BEEN DESIGNATED NONATTAINMENT WITH THE 8-HOUR OZONE NATIONAL AMBIENT AIR QUALITY STANDARD:</b>	<b>AREAS THAT HAVE BEEN IDENTIFIED AS NONATTAINMENT WITH THE 8-HOUR OZONE STANDARD, BUT HAVE RECEIVED DEFERMENT OF OFFICIAL NONATTAINMENT DESIGNATION:</b>
<b>NORTHERN VIRGINIA/MD NONATTAINMENT AREA</b>  Arlington County Fairfax County Loudoun County Prince William County City of Alexandria City of Fairfax City of Falls Church City of Manassas City of Manassas Park	<b>ROANOKE EARLY ACTION AREA</b>  Botetourt County Roanoke County City of Roanoke City of Salem Town of Vinton
<b>HAMPTON ROADS NONATTAINMENT AREA</b>  Gloucester County Isle of Wight County James City County York County City of Chesapeake City of Hampton City of Newport News City of Norfolk City of Poquoson City of Portsmouth City of Suffolk City of Virginia Beach City of Williamsburg	<b>FREDERICK COUNTY EARLY ACTION AREA</b>  Frederick County City of Winchester
<b>RICHMOND NONATTAINMENT AREA</b>  Charles City County Chesterfield County Hanover County Henrico County Prince George County City of Colonial Heights City of Hopewell City of Petersburg City of Richmond	
<b>SHENANDOAH NATIONAL PARK NONATTAINMENT AREA</b>  Shenandoah National Park (the portions in Page and Madison Counties)	

## DATA CAPTURE CRITERIA

### Minimum Number of Observations

3-hour average	3 consecutive hourly observations
8-hour	6 hourly observations
24-hour	18 hourly observations
Quarterly averages (PM <sub>2.5</sub> , PM <sub>10</sub> )	75% of scheduled samples
Yearly averages (Continuous Instruments)	75% of total possible observations
Yearly averages (PM <sub>2.5</sub> , PM <sub>10</sub> )	Four complete quarterly averages

## National Ambient Air Quality Standards

National Ambient Air Quality Standards (NAAQS), published by the Environmental Protection Agency (EPA) in connection with the Clean Air Act and 40 CFR, Part 50, are listed below.

POLLUANT	PRIMARY STANDARD		SECONDARY STANDARD	
	ug/m <sup>3</sup>	ppm	ug/m <sup>3</sup>	ppm
<b>CARBON MONOXIDE</b> 8-hour concentration 1-hour concentration	10,000 <sup>a</sup> 40,000 <sup>a</sup>	9 <sup>a</sup> 35 <sup>a</sup>		
<b>SULFUR DIOXIDE</b> Annual arithmetic mean 24-hour concentration 3-hour concentration	80 365 <sup>a</sup>	0.03 0.14 <sup>a</sup>	1300 <sup>a</sup>	0.50 <sup>a</sup>
<b>NITROGEN DIOXIDE</b> Annual arithmetic mean	100	0.053	Same as primary	
<b>OZONE</b> 8-hour concentration 1-hour concentration	157 <sup>b</sup> 235 <sup>c</sup>	0.08 <sup>b</sup> 0.12 <sup>c</sup>	Same as primary	
<b>LEAD</b> Quarterly arithmetic mean	1.5		Same as primary	
<b>PARTICULATE MATTER</b> <b>PM<sub>2.5</sub></b> Annual arithmetic mean 24-hour concentration <b>PM<sub>10</sub></b> Annual arithmetic mean 24-hour concentration	15 <sup>d</sup> 65 <sup>e</sup> 50 150 <sup>a</sup>		Same as primary	

<sup>a</sup> Not to be exceeded more than once a year

<sup>b</sup> 3-year average of the 4th highest 8-hour concentration may not exceed 0.08 ppm

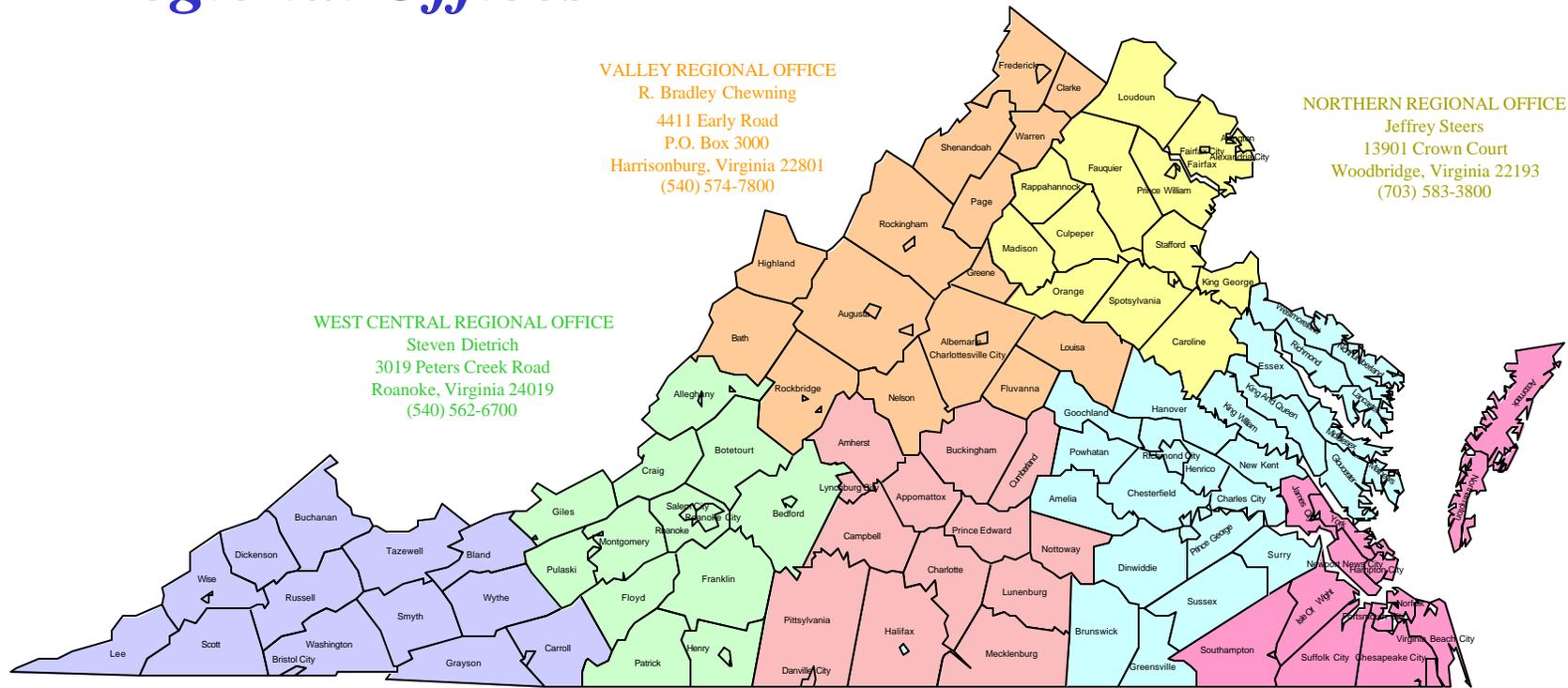
<sup>c</sup> Areas in nonattainment with the 1-hour standard must meet that standard before demonstrating attainment with the 8-hour standard.

<sup>d</sup> Based on a 3-year average of annual averages

<sup>e</sup> Based on a 3-year average of annual 98th percentile values

# DEPARTMENT OF ENVIRONMENTAL QUALITY

## *Regional Offices*



**VALLEY REGIONAL OFFICE**  
 R. Bradley Chewning  
 4411 Early Road  
 P.O. Box 3000  
 Harrisonburg, Virginia 22801  
 (540) 574-7800

**NORTHERN REGIONAL OFFICE**  
 Jeffrey Steers  
 13901 Crown Court  
 Woodbridge, Virginia 22193  
 (703) 583-3800

**WEST CENTRAL REGIONAL OFFICE**  
 Steven Dietrich  
 3019 Peters Creek Road  
 Roanoke, Virginia 24019  
 (540) 562-6700

**SOUTHWEST REGIONAL OFFICE**  
 Michael D. Overstreet  
 355 Deadmore St.  
 P.O. Box 1688  
 Abingdon, Virginia 24212  
 (276) 676-4800

**SOUTH CENTRAL REGIONAL OFFICE**  
 Thomas L. Henderson  
 7705 Timberlake Road  
 Lynchburg, Virginia 24502  
 (434) 582-5120

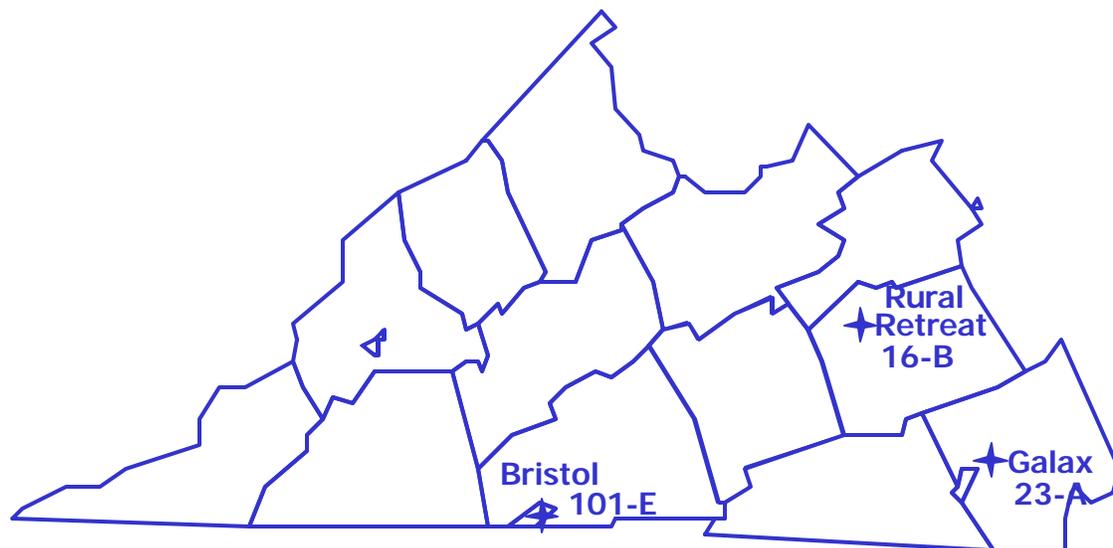
**PIEDMONT REGIONAL OFFICE**  
 Gerard Seeley, Jr.  
 4949-A Cox Road  
 Glen Allen, Virginia 23060  
 (804) 527-5020

**TIDEWATER REGIONAL OFFICE**  
 Francis L. Daniel  
 5636 Southern Blvd.  
 Virginia Beach, Virginia 23462  
 (757) 518-2000

**AIR SATELLITE OFFICES**  
 Fredericksburg, 806 Westwood Office Park, Fredericksburg VA 22401 (540) 899-4600

**VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY  
 AMBIENT AIR MONITORING SITE LIST  
 2003**

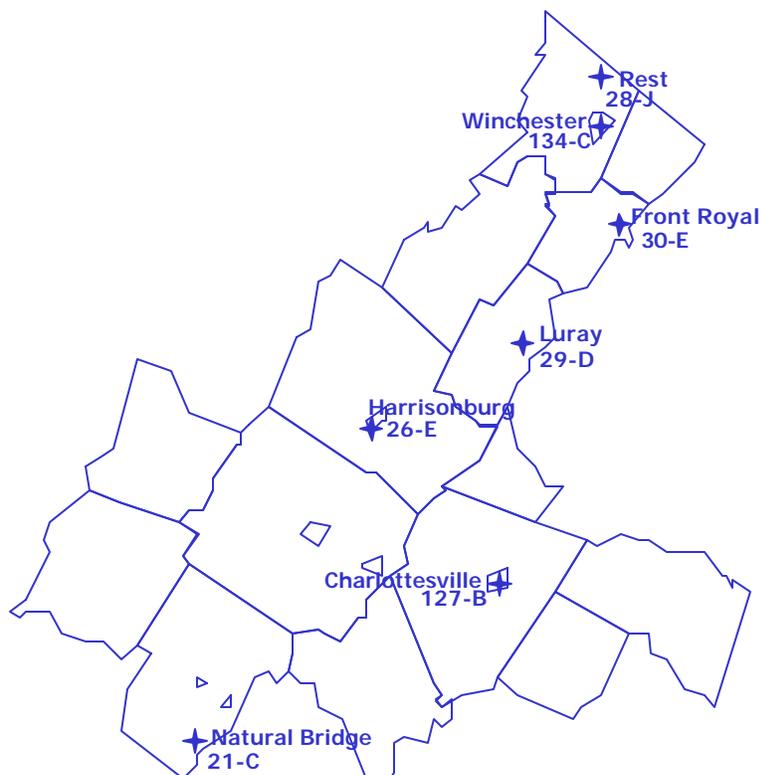
**SOUTHWEST MONITORING NETWORK**



STATION NUMBER	POLLUT.	SITE TYPE	LOCATION	AIRS NUMBER	CITY/COUNTY	LAT/ LONG
16-B	O <sub>3</sub>	SLAM S	Sewage Disposal Plant	51-197-0002	Rural Retreat Wythe Co.	36° 53' 35" 81° 15' 18"
23-A	PM <sub>10</sub>	SLAM S	Gladeville Elementary School	51-035-0001	Galax Carroll Co.	36° 42' 09" 80° 52' 48"
101-E	PM <sub>2.5</sub> , Speciation	SLAM S SPM	Highland View Elementary School	51-520-0006	Bristol	36° 36' 28" 82° 09' 52"

**VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY  
AMBIENT AIR MONITORING SITE LIST  
2003**

**VALLEY MONITORING NETWORK**



STATION NUMBER	POLLUT.	SITE TYPE	LOCATION	AIRS NUMBER	CITY/COUNTY	LAT/ LONG
21-C	O <sub>3</sub> , PM <sub>2.5</sub>	SLAMS IMPROVE	Natural Bridge Ranger Station	51-163-0003	Rockbridge Co.	37° 37' 34" 79° 30' 47"
26-E	PM <sub>10</sub> , SO <sub>2</sub>	SLAMS	Valley DEQ Office 4411 Early Road	51-165-0002	Harrisonburg Rockingham Co.	38° 23' 22" 78° 54' 51"
28-J	O <sub>3</sub>	SLAMS	Woodbine Road Lester Building Systems	51-069-0010	Rest Frederick Co.	39° 16' 58" 78° 04' 53"
29-D	O <sub>3</sub> , PM <sub>2.5</sub>	SLAMS	Luray Caverns Airport	51-139-0004	Luray Page Co.	38° 39' 48" 78° 30' 17"
30-E	PM <sub>10</sub>	SLAMS	Warren Co. Memorial Hospital 1000 Shenandoah Avenue	51-187-0004	Front Royal Warren Co.	38° 55' 58" 78° 11' 54"
127-B	PM <sub>10</sub>	SLAMS	City Hall Annex 606 E. Market Street	51-540-0002	Charlottesville	38° 01' 57" 78° 28' 37"
134-C	PM <sub>10</sub>	SLAMS	Winchester Courts Building	51-840-0002	Winchester	39° 11' 08" 78° 09' 47"

**VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY  
 AMBIENT AIR MONITORING SITE LIST  
 2003**

**WEST CENTRAL MONITORING NETWORK**



STATION NUMBER	POLLUT.	SITE TYPE	LOCATION	AIRS NUMBER	CITY/COUNTY	LAT/ LONG
19-A6	SO <sub>2</sub> , NO <sub>2</sub> , O <sub>3</sub>	NAMS/ SLAMS	East Vinton Elementary School Ruddell Road	51-161-1004	Vinton Roanoke Co.	37° 17' 08" 79° 53' 03"
109-H	PM <sub>10</sub>	SLAMS	101 Cherry Hill Circle	51-770-0011	Roanoke	37° 16' 33" 79° 59' 58"
109-J	CO	SLAMS	Carver Road & Courtland Drive	51-770-0013	Roanoke	37° 17' 05" 79° 56' 01"
109-L	PM <sub>2.5</sub> , Speciation	SLAMS SPM	Raleigh Court Library	51-770-0014	Roanoke	37° 15' 22" 79° 59' 06"
110-B	PM <sub>2.5</sub>	SLAMS	Market St. Fire Station	51-775-0010	Salem	37° 17' 31" 80° 03' 25"

**VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY  
 AMBIENT AIR MONITORING SITE LIST  
 2003**

**SOUTH CENTRAL MONITORING NETWORK**



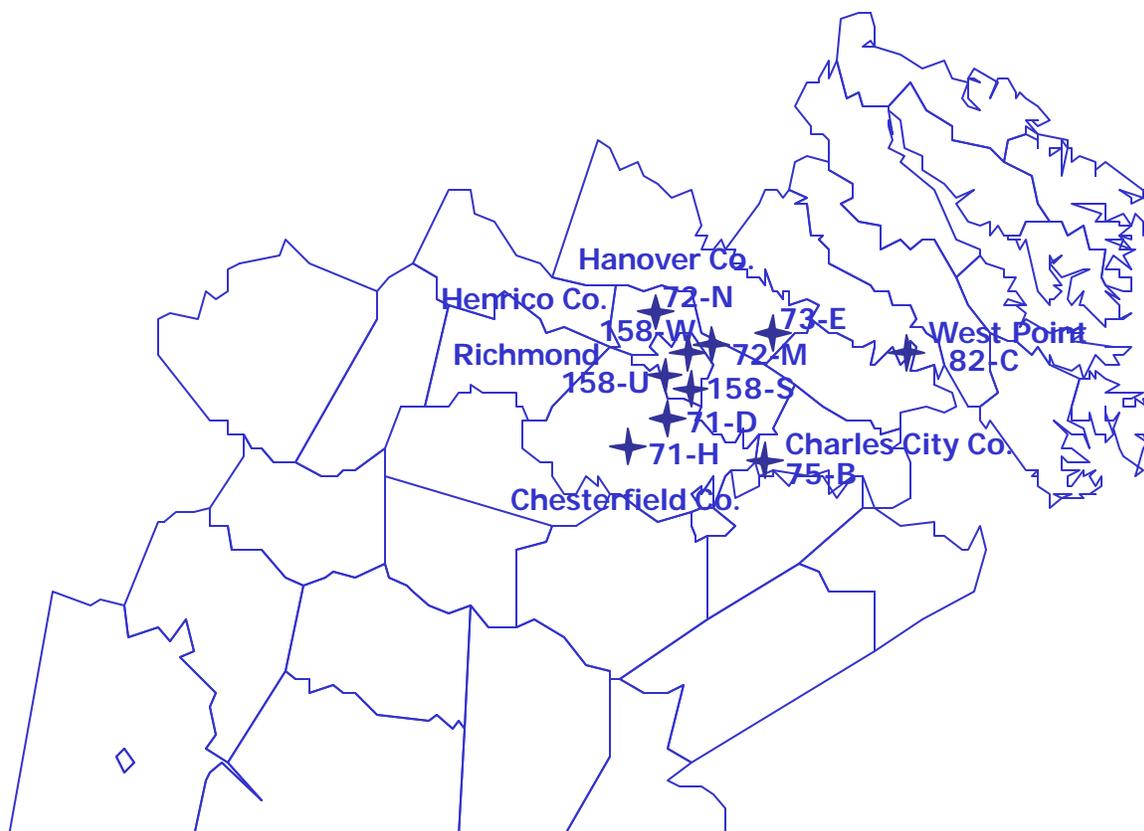

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STATION NUMBER	POLLUT.	SITE TYPE	LOCATION	AIRS NUMBER	CITY/COUNTY	LAT/ LONG
155-Q*	PM <sub>2.5</sub>	SLAMS	Leesville Hwy. & Greystone Dr.	51-680-0015	Lynchburg	37° 33' 18" 79° 21' 45"

\* maintained by West Central Region personnel

**VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY  
 AMBIENT AIR MONITORING SITE LIST  
 2003**

**PIEDMONT MONITORING NETWORK**



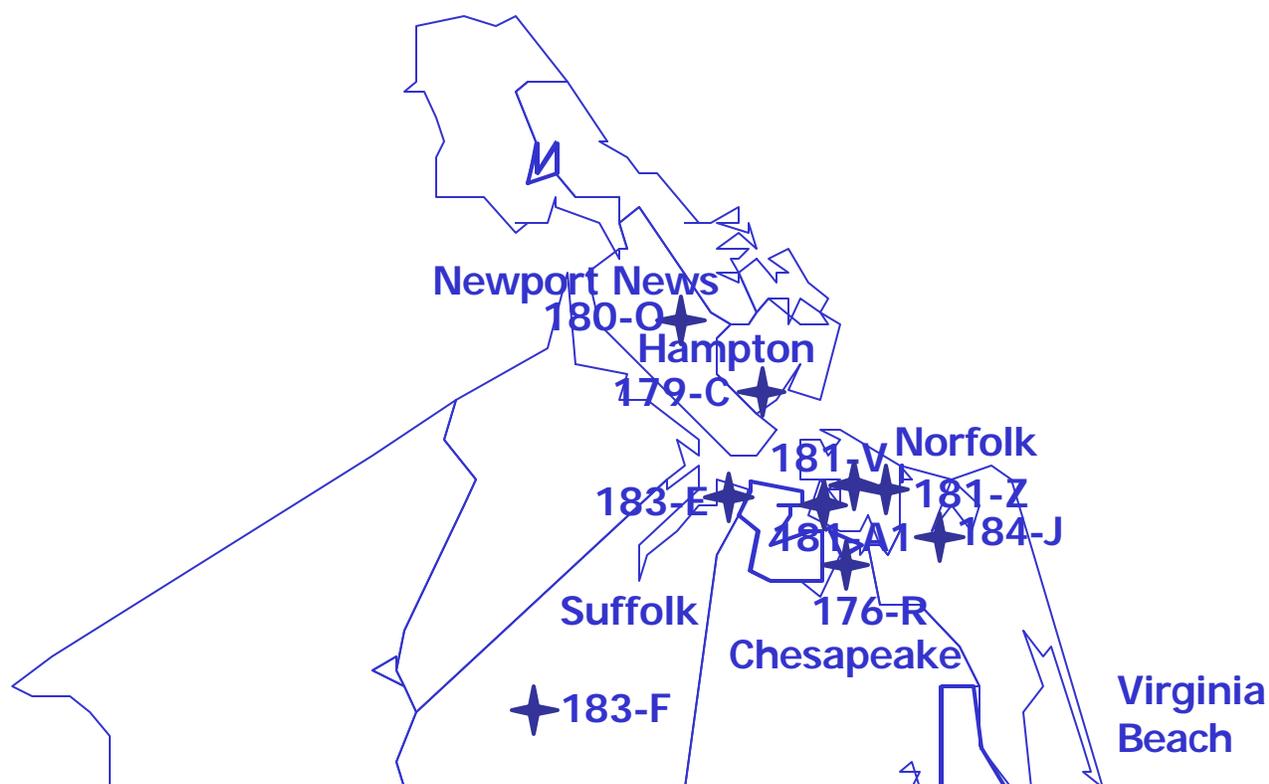
STATION NUMBER	POLLUT.	SITE TYPE	LOCATION	AIRS NUMBER	CITY/COUNTY	LAT/ LONG
71-D	PM <sub>2.5</sub>	SLAMS	Bensley Armory	51-041-0003	Chesterfield Co.	37° 26' 10" 77° 27' 03"
71-H	O <sub>3</sub>	SLAMS	Beach Road Highway Shop	51-041-0004	Chesterfield Co.	37° 21' 32" 77° 35' 37"
72-M	O <sub>3</sub> , VOC, PM <sub>2.5</sub>	NAMS/ SLAMS	Math and Science Center 2401 Hartman Street	51-087-0014	Henrico Co.	37° 33' 30" 77° 24' 01"
72-N	PM <sub>2.5</sub>	SLAMS	DEQ - Piedmont Regional Office 4949A Cox Road	51-087-0015	Henrico Co.	37° 40' 13" 77° 34' 03"
73-E	O <sub>3</sub>	NAMS	McClellan Road	51-085-0003	Hanover Co.	37° 36' 21" 77° 13' 07"

**PIEDMONT (Cont.)**

<b>STATION NUMBER</b>	<b>POLLUT.</b>	<b>SITE TYPE</b>	<b>LOCATION</b>	<b>AIRS NUMBER</b>	<b>CITY/COUNTY</b>	<b>LAT/ LONG</b>
75-B	O <sub>3</sub> , NO <sub>2</sub> , SO <sub>2</sub> , PM <sub>2.5</sub>	NAMS/ SLAMS	Charles City County Route 608	51-036-0002	Charles City Co.	37° 20' 31" 77° 15' 39"
82-C	PM <sub>10</sub>	SLAMS	West Point Elementary School Thompson Ave. and Chelsea Road	51-101-0003	West Point King William Co.	37° 33' 34" 76° 47' 43"
158-S	PM <sub>10</sub> , PM <sub>2.5</sub> , Speciation	NAMS/ SLAMS SPM	DEQ - Air Quality Monitoring 5324 Distributor Drive	51-760-0020	Richmond	37° 30' 38" 77° 29' 54"
158-U	CO	SLAMS	Forest Hill Fire Station 7410 Forest Hill Avenue	51-760-0022	Richmond	37° 32' 22" 77° 31' 58"
158-W	CO, SO <sub>2</sub> , NO <sub>2</sub>	SLAMS	Science Museum of Virginia DMV and Leigh Street	51-760-0024	Richmond	37° 33' 45" 77° 27' 55"

**VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY  
 AMBIENT AIR MONITORING SITE LIST  
 2003**

**TIDEWATER MONITORING NETWORK**



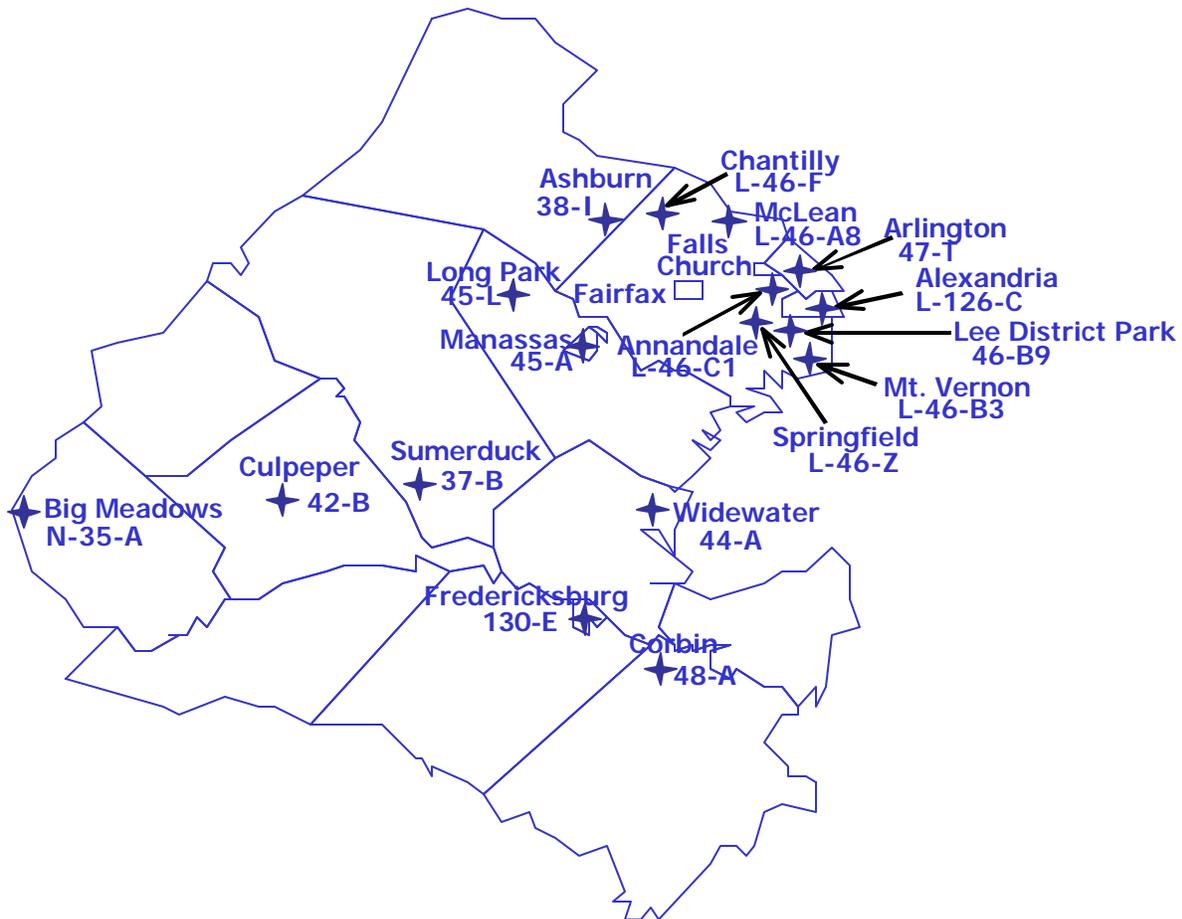
STATION NUMBER	POLLUT.	SITE TYPE	LOCATION	AIRS NUMBER	CITY/COUNTY	LAT/ LONG
176-R	PM <sub>10</sub> , PM <sub>2.5</sub>	NAMS/ SLAMS	Oscar Smith Middle School Stadium 2500 Rodgers Street	51-550-0012	Chesapeake	36° 48' 14" 76° 16' 21"
179-C	PM <sub>10</sub> , CO, SO <sub>2</sub> , O <sub>3</sub> PM <sub>2.5</sub>	NAMS/ SLAMS	Virginia School for the Deaf & Blind 700 Shell Road	51-650-0004	Hampton	37° 00' 12" 76° 23' 57"
180-O	PM <sub>2.5</sub>	SLAMS	Pump Station 103	51-700-0013	Newport News	37° 05' 59" 76° 28' 53"
181-A1	PM <sub>10</sub> , PM <sub>2.5</sub>	SLAMS	NOAA Property 2nd and Woodis Avenue	51-710-0024	Norfolk	36° 51' 28" 76° 18' 06"
181-V	CO	NAMS	Post Office 600 Church Street	51-710-0019	Norfolk	36° 51' 12" 76° 16' 43"

**TIDEWATER (Cont.)**

<b>STATION NUMBER</b>	<b>POLLUT.</b>	<b>SITE TYPE</b>	<b>LOCATION</b>	<b>AIRS NUMBER</b>	<b>CITY/ COUNTY</b>	<b>LAT/ LONG</b>
181-Z	CO, SO <sub>2</sub> , NO <sub>2</sub>	NAMS/ SLAMS	Norfolk State University	51-710-0023	Norfolk	36° 51' 01" 76° 15' 28"
183-E	O <sub>3</sub>	NAMS	Tidewater Community College Frederick Campus	51-800-0004	Suffolk	36° 54' 12" 76° 26' 19"
183-F	O <sub>3</sub>	NAMS	Tidewater Research Station Route 610	51-800-0005	Suffolk	36° 40' 03" 76° 43' 53"
184-J	PM <sub>2.5</sub>	SLAMS	DEQ - Tidewater Regional Office 5636 Southern Blvd.	51-810-0008	Va. Beach	36° 50' 28" 76° 10' 53"

**VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY  
 AMBIENT AIR MONITORING SITE LIST  
 2003**

**NORTHERN VA. MONITORING NETWORK**



STATION NUMBER	POLLUT.	SITE TYPE	LOCATION	AIRS NUMBER	CITY/COUNTY	LAT/ LONG
37-B	O <sub>3</sub>	SLAMS	Phelps Wildlife Area Route 651	51-061-0002	Sumerduck Fauquier Co.	38° 28' 30" 77° 46' 04"
38-I	NO <sub>2</sub> , O <sub>3</sub> , PM <sub>2.5</sub>	SLAMS	Broad Run High School Route 641	51-107-1005	Ashburn Loudoun Co.	39° 01' 28" 77° 29' 24"
42-B	PM <sub>10</sub>	SLAMS	Farmington Elementary School Sunset Lane	51-047-0002	Culpeper Culpeper Co.	38° 27' 26" 78° 00' 40"
44-A	O <sub>3</sub>	SLAMS	Widewater Elementary School Den Rich Road	51-179-0001	Widewater Stafford Co.	38° 28' 59" 77° 22' 13"

**NORTHERN VA. (Cont.)**

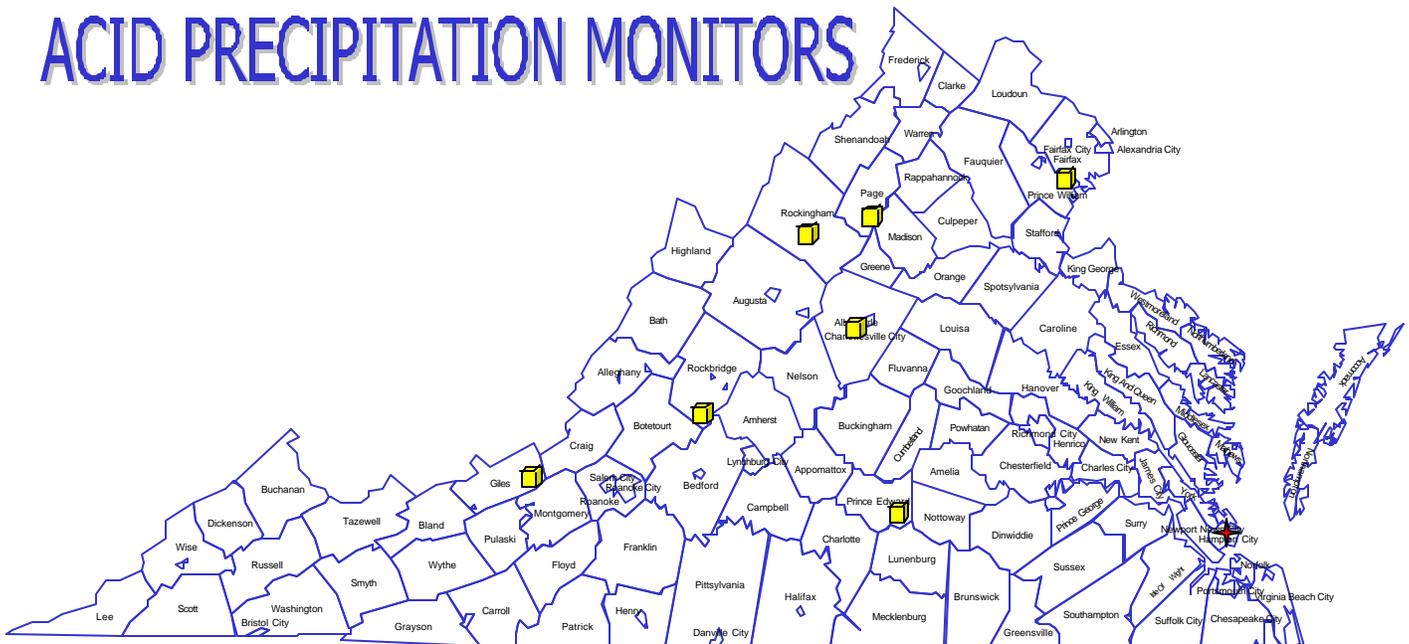
STATION NUMBER	POLLUT.	SITE TYPE	LOCATION	AIRS NUMBER	CITY/COUNTY	LAT/ LONG
45-A	PM <sub>10</sub>	SLAMS	Manassas Health Department 9301 Lee Avenue	51-153-0001	Manassas Prince William Co.	38° 45' 11" 77° 28' 39"
45-L	O <sub>3</sub> , NO <sub>2</sub>	SLAMS	Long Park Route 15	51-153-0009	Prince William Co.	38° 51' 19" 77° 38' 08"
46-B9	PAMS, NO <sub>y</sub> , O <sub>3</sub> , CO, PM <sub>2.5</sub>	PAMS	Lee District Park Telegraph Road	51-059-0030	Franconia Fairfax Co.	38° 46' 22" 77° 06' 20"
47-T	CO, NO <sub>2</sub> , O <sub>3</sub> , PM <sub>2.5</sub>	SLAMS	Aurora Hills Visitors Center 18th and Hayes Streets	51-013-0020	Arlington Co.	38° 51' 27" 77° 03' 33"
48-A	O <sub>3</sub> , NO <sub>2</sub> , NO <sub>y</sub> , VOC	PAMS	U.S.G.S. Geomagnetic Center	51-033-0001	Corbin Caroline Co.	38° 12' 11" 77° 22' 38"
130-E	PM <sub>10</sub>	SLAMS	Hugh Mercer Elementary School 2100 Cowan Boulevard	51-630-0004	Fredericksburg	38° 18' 17" 77° 29' 11"
L-46-A8	CO, SO <sub>2</sub> , NO <sub>2</sub> , O <sub>3</sub> , PM <sub>2.5</sub>	SLAMS	McLean Governmental Center 1437 Balls Hill Road	51-059-5001	McLean Fairfax Co.	38° 55' 55" 77° 11' 56"
L-46-B3	PM <sub>10</sub> , O <sub>3</sub>	SLAMS	Mt. Vernon Fire Station 2675 Sherwood Hall Lane	51-059-0018	Mount Vernon Fairfax Co.	38° 44' 33" 77° 04' 39"
L-46-F	CO, SO <sub>2</sub> , NO <sub>2</sub> , O <sub>3</sub> , PM <sub>10</sub>	SLAMS	Upper Cub Run Drive	51-059-0005	Chantilly Fairfax Co.	38° 53' 38" 77° 27' 55"
L-46-Z	PM <sub>10</sub>	NAMS	Doctor's Exchange 6120 Brandon Avenue	51-059-3002	Springfield Fairfax Co.	38° 47' 01" 77° 10' 57"
L-46-C1	CO, SO <sub>2</sub> , NO <sub>2</sub> , O <sub>3</sub> , PM <sub>2.5</sub>	SLAMS	Mason Governemental Center 6507 Columbia Pike	51-059-1005	Annandale Fairfax Co.	38° 50' 15" 77° 09' 47"
L-126-C	CO, SO <sub>2</sub> , NO <sub>2</sub> , O <sub>3</sub>	NAMS/ SLAMS	Alexandria Health Department 517 North Saint Asaph Street	51-510-0009	Alexandria	38° 48' 38" 77° 02' 40"
N-35-A	O <sub>3</sub> , SO <sub>2</sub> PM <sub>2.5</sub>	Non-EPA Fed. IMPROVE	Big Meadows, National Park Service	51-113-0003	Madison Co.	38° 31' 19" 78° 26' 10"

**TABLE OF THE NUMBER OF CRITERIA POLLUTANT  
MONITORING SITES  
NAMS/SLAMS 2003**

<b>REGION</b>	<b>PM<sub>2.5</sub></b>	<b>PM<sub>10</sub></b>	<b>CO</b>	<b>SO<sub>2</sub></b>	<b>NO<sub>2</sub></b>	<b>O<sub>3</sub></b>	<b>TOTAL</b>
Southwest	1	1	---	---	---	1	3
Valley	1	4	---	1	---	3	9
West Central	2	1	1	1	1	1	7
South Central	1	---	---	---	---	---	1
Piedmont	5	2	2	2	2	4	17
Tidewater	5	3	3	2	1	3	17
*Northern	5	6	6	4	8	12	41
<b>TOTAL</b>	<b>20</b>	<b>17</b>	<b>12</b>	<b>10</b>	<b>12</b>	<b>24</b>	<b>95</b>

\* This includes sites operated by the DEQ, Fairfax Co. and Alexandria

# ACID PRECIPITATION MONITORS



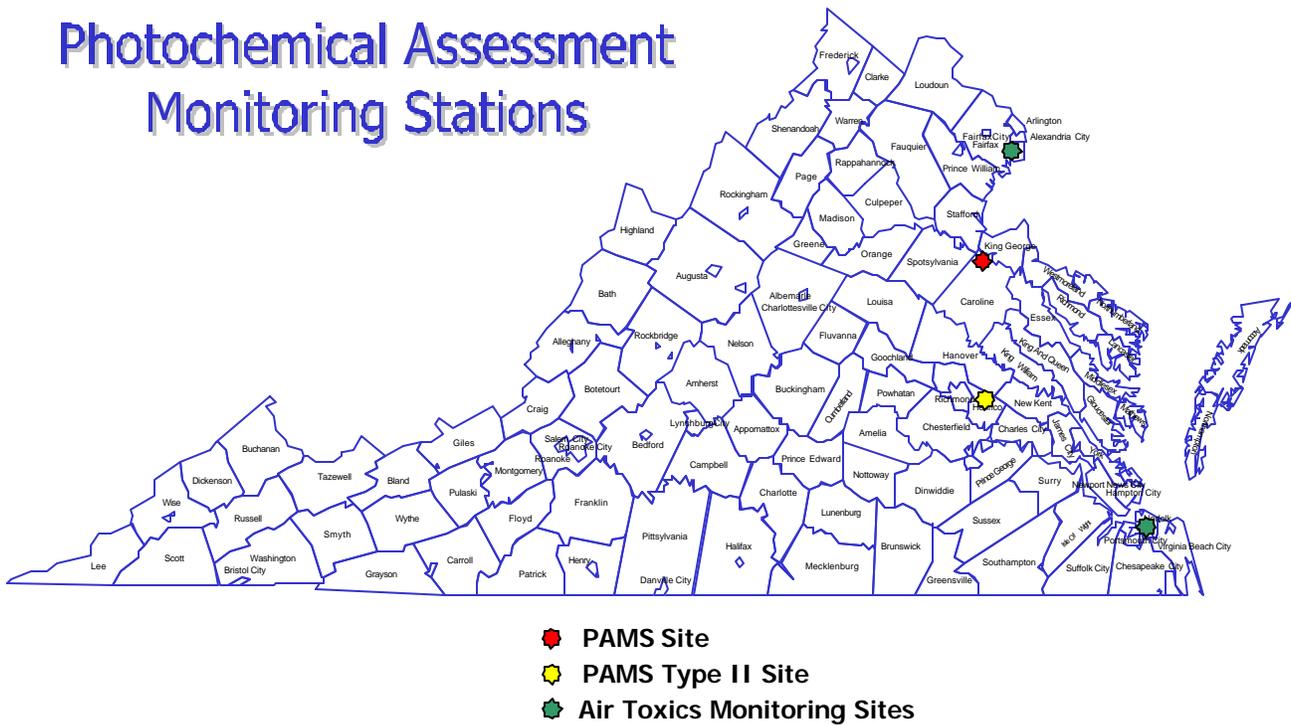
-  Virginia Acid Precipitation Network
-  Federal National Acid Deposition Program

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The Virginia Acid Precipitation Network (VAPN) consisted of one monitoring site in Hampton in 2003. A second site, Occoquan (Fairfax County) was moved to Mason Neck State Park (Fairfax County) and converted to a National Acid Deposition Program (NADP) site. The Virginia Department of Environmental Quality sponsored two NADP sites in 2003: Mason Neck and Rockbridge County. VAPN weekly samples are collected every Tuesday and mailed to the Department of General Services, Division of Consolidated Laboratory Services, Bureau of Chemistry, where the following chemical analyses are conducted: pH (laboratory), conductivity (laboratory), ammonium, chloride, sodium, potassium, magnesium, calcium, anion-cation balance, nitrate, sulfate, and phosphate. VAPN data and information are available upon request from the DEQ Air Division, Office of Data Analysis. VAPN site information, limited data, and related reports are available on-line at: [http://esm.versar.com/pprp/features/aciddep/regional\\_sites/va\\_pn/va\\_prog.html#overview](http://esm.versar.com/pprp/features/aciddep/regional_sites/va_pn/va_prog.html#overview).

The NADP now has seven monitoring sites in Virginia: Big Meadows (Shenandoah National Park), Hortons Station (Giles County), Charlottesville, Prince Edward County, Harrisonburg (Rockingham County), Mason Neck (Fairfax County), and Rockbridge County. National Acid Deposition Program site information and data are available on-line at <http://nadp.sws.uiuc.edu>.

# Photochemical Assessment Monitoring Stations



In 2003, the Air Quality Monitoring (AQM) program of the Department of Environmental Quality operated two Photochemical Assessment Monitoring stations (PAMS) at Corbin in Caroline County, and the Mathematics and Science Center in Henrico County. Additionally, 24-hour PAMS Volatile Organic Compounds (VOC) samples were collected from two core Air Toxics Monitoring Network (ATMN) sites located on the property of the National Oceanic and Atmospheric Administration (NOAA) in Norfolk, and Lee District Park in Fairfax County, using a one in six day sampling schedule.

Corbin was operated all year as a PAMS Type I site, collecting one 24-hour VOC sample collected every six days (a Type I site measures upwind background ozone precursor concentrations). In addition episodic sampling was conducted on days forecasted to be high ozone alert days for the Washington-Baltimore area in the summer.

The Math and Science Center monitoring station was upgraded to a PAMS Type II site during the 2003 season, with one 24-hour VOC sample taken every six days, and four 3-hour carbonyl samples collected every third day from June through August (a Type II site measures maximum ozone precursor concentrations in the primary downwind direction on days conducive to ozone formation). In addition, hourly samples were collected using an Auto Gas Chromatograph, which was previously located at the PAMS Type IIA site at Lee District Park in Fairfax County (a Type IIA site measures maximum ozone precursors in the secondary downwind direction).

AQM used the manual method for collecting ambient air samples. This method involves the collection of integrated, whole air samples by using evacuated Summa<sup>T</sup> canisters and Xontech air samplers. Each VOC sample from Corbin was analyzed by the Division of Consolidated Laboratory Services using a Gas Chromatograph/Flame Ionization Detector. Samples from Math and Science Center, Lee District Park, and NOAA were analyzed by the Maryland Department of the Environment, Air and Radiation Management Administration, using a Gas Chromatograph/Flame Ionization Detector. All VOC samples were analyzed for the presence of fifty-five target volatile organic precursors, and the measured concentration of Total Nonmethane Organic Compounds (TNMOC).

Detailed PAMS data are available upon written request to the Virginia Department of Environmental Quality, Office of Air Quality Monitoring.

2003 Average Concentration of Detectable Volatile Ozone Precursors  
 Photochemical Assessment Monitoring Station (PAMS) Type I - Corbin, VA (cont.)  
 Concentrations are in ppbC

Parameter	Compound Name	#N	Minimum	Maximum	Median	Average	StDev
43203	ethylene	49	0.87	4.56	1.94	2.32	0.91
43206	acetylene	49	0.57	4.57	1.5	1.64	0.84
43202	ethane	49	0.05	17.79	5.68	6.13	3.14
43205	propylene	49	0.27	1.44	0.65	0.70	0.29
43204	propane	49	1.72	14.25	4.38	4.85	2.51
43214	isobutane	49	0.05	3.17	0.92	1.11	0.66
43280	1-butene	49	0.05	3.62	0.58	0.86	0.89
43212	n-butane	49	0.05	5.98	1.72	1.90	1.62
43216	t-2-butene	49	0.05	1.28	0.05	0.10	0.18
43217	c-2-butene	49	0.05	4.52	0.05	0.36	0.80
43221	isopentane	49	0.05	112.12	4.23	7.74	15.94
43224	1-pentene	49	0.05	1.32	0.33	0.38	0.30
43220	n-pentane	49	0.05	6.29	1.05	1.52	1.44
43243	isoprene	49	0.05	32.95	0.25	2.99	6.88
43226	t-2-pentene	49	0.05	0.84	0.05	0.13	0.16
43227	c-2-pentene	49	0.05	0.62	0.13	0.19	0.18
43244	2,2-dimethylbutane	49	0.05	0.45	0.21	0.22	0.11
43242	cyclopentane	49	0.05	0.97	0.07	0.14	0.18
43284	2,3-dimethylbutane	49	0.05	4.61	0.31	0.81	1.07
43285	2-methylpentane	49	0.05	4.98	1.37	1.55	0.88
43230	3-methylpentane	49	0.05	1.31	0.51	0.52	0.29
43245	1-Hexene	49	0.05	1.18	0.23	0.33	0.28
43231	n-hexane	49	0.23	1.73	0.58	0.66	0.33
43262	methylcyclopentane	49	0.05	1.55	0.31	0.36	0.27
43247	2,4-dimethylpentane	49	0.05	1.04	0.22	0.25	0.18
45201	benzene	49	0.05	3.5	1.47	1.45	0.72
43248	cyclohexane	49	0.05	0.76	0.24	0.27	0.19
43263	2-methylhexane	49	0.05	1.09	0.41	0.43	0.28
43291	2,3-dimethylpentane	49	0.05	1.14	0.35	0.37	0.24
43249	3-methylhexane	49	0.61	9.37	1.25	1.65	1.59
43250	224-trimethylpentane	49	0.05	1.04	0.34	0.38	0.23
43232	n-heptane	49	0.05	0.91	0.24	0.28	0.17
43261	methylcyclohexane	49	0.05	1.27	0.17	0.23	0.24
43252	234-trimethylpentane	49	0.05	2.43	0.26	0.33	0.36
45202	toluene	49	0.05	4.14	1.56	1.76	0.77
43960	2-methylheptane	49	0.05	2.13	0.15	0.22	0.31
43253	3-methylheptane	49	0.05	10.23	0.14	0.60	1.51
43233	n-octane	49	0.05	1.74	0.05	0.15	0.28

2003 Average Concentration of Detectable Volatile Ozone Precursors  
 Photochemical Assessment Monitoring Station (PAMS) Type I - Corbin, VA (cont.)  
 Concentrations are in ppbC

Parameter	Compound Name	#N	Minimum	Maximum	Median	Average	StDev
45203	ethylbenzene	49	0.09	1.02	0.27	0.29	0.17
45109	m/p-xylene	49	0.12	1.99	0.66	0.71	0.41
45220	styrene	49	0.23	12.04	1.13	1.57	1.70
45204	o-xylene	49	0.05	7.81	0.28	0.65	1.25
43235	n-nonane	49	0.05	0.7	0.17	0.20	0.15
45210	isopropylbenzene	49	0.05	0.63	0.1	0.15	0.14
45209	n-propylbenzene	49	0.05	1.48	0.14	0.23	0.27
45212	m-ethyltoluene	49	0.05	3.11	0.37	0.44	0.57
45213	p-ethyltoluene	49	0.05	1.34	0.25	0.35	0.35
45207	135-trimethylbenzene	49	0.05	24.1	0.33	1.18	3.71
45211	o-ethyltoluene	49	0.05	1.85	0.23	0.29	0.37
45208	124-trimethylbenzene	49	0.05	3.13	0.49	0.59	0.50
43238	n-decane	49	0.05	2.61	0.19	0.28	0.43
45225	123-trimethylbenzene	49	0.05	4.75	0.34	0.77	1.04
45218	m-diethylbenzene	49	0.05	4.73	0.05	0.75	1.24
45219	p-diethylbenzene	49	0.05	1.69	0.26	0.31	0.30
43954	n-undecane	49	0.05	2.55	0.23	0.31	0.36
43141	n-dodecane	49	0.05	2.39	0.27	0.53	0.64
<b>43000</b>	<b>PAMHC</b>	49	26.03	173.4	50.06	55.13	25.08
<b>43102</b>	<b>TNMOC</b>	49	36.31	191.8	82.95	89.98	37.21

**2003 AVERAGE CONCENTRATION OF DETECTABLE VOLATILE OZONE PRECURSORS  
PHOTOCHEMICAL ASSESSMENT MONITORING STATION (PAMS) TYPE II - Math & Science**

**Center**

Concentrations are in ppbC

Parameter	Compound Name	Num	Min	Max	Median	Average	StDev
43203	Ethylene	55	0.70	10.27	2.73	3.24	2.28
43206	Acetylene	55	0.81	13.55	3.09	3.87	2.50
43202	Ethane	55	2.35	35.53	8.56	9.77	6.08
43205	Propylene	55	0.41	4.19	1.04	1.32	0.88
43204	Propane	55	1.88	19.80	6.26	7.38	4.03
43214	Isobutane	55	0.47	6.44	1.88	2.24	1.40
43280	1-butene	55	0.12	3.25	0.83	1.04	0.70
43212	n-butane	55	0.64	18.95	4.15	5.75	5.01
43216	t-2-butene	55	0.07	0.56	0.24	0.26	0.13
43217	c-2-butene	55	0.05	0.59	0.24	0.26	0.13
43221	Isopentane	55	1.09	14.28	4.17	5.34	3.04
43224	1-pentene	55	0.17	0.87	0.36	0.40	0.17
43220	n-pentane	55	0.57	5.29	1.63	2.05	1.17
43243	Isoprene	55	0.05	12.14	2.16	2.93	2.38
43226	t-2-pentene	55	0.05	1.27	0.24	0.36	0.28
43227	c-2-pentene	55	0.05	0.96	0.28	0.33	0.20
43244	2,2-dimethylbutane	55	0.05	0.92	0.31	0.36	0.19
43242	Cyclopentane	55	0.05	0.91	0.31	0.35	0.19
43284	2,3-dimethylbutane	55	0.05	1.46	0.44	0.55	0.33
43285	2-methylpentane	55	0.49	4.34	1.16	1.56	0.95
43230	3-methylpentane	55	0.32	3.88	1.10	1.29	0.79
43245	1-Hexene	55	0.12	3.39	0.40	0.71	0.74
43231	n-hexane	55	0.45	3.66	0.91	1.19	0.73
43262	Methylcyclopentane	55	0.05	1.96	0.56	0.73	0.44
43247	2,4-dimethylpentane	55	0.05	0.78	0.28	0.32	0.17
45201	Benzene	55	0.89	5.44	2.01	2.20	0.90
43248	Cyclohexane	55	0.14	2.78	0.29	0.40	0.39
43263	2-methylhexane	55	0.05	1.59	0.46	0.58	0.34
43291	2,3-dimethylpentane	55	0.05	0.85	0.30	0.37	0.19
43249	3-methylhexane	55	0.05	1.93	0.72	0.84	0.49
43250	2,2,4-trimethylpentane	55	0.40	4.14	1.19	1.45	0.94
43232	n-heptane	55	0.05	1.50	0.48	0.56	0.32
43261	Methylcyclohexane	55	0.05	1.31	0.28	0.35	0.23
43252	2,3,4-trimethylpentane	55	0.05	1.68	0.50	0.60	0.38
45202	Toluene	55	1.45	10.87	3.36	4.32	2.39
43960	2-methylheptane	55	0.05	2.75	0.24	0.32	0.37
43253	3-methylheptane	55	0.05	2.78	0.26	0.36	0.38
43233	n-octane	55	0.05	7.45	0.32	0.50	0.97
45203	Ethylbenzene	55	0.29	2.46	0.60	0.73	0.42
45109	m/p-xylene	55	0.80	6.85	1.53	1.97	1.21
45220	Styrene	55	0.05	1.12	0.33	0.38	0.21
45204	o-xylene	55	0.32	3.07	0.61	0.79	0.50
43235	n-nonane	55	0.13	7.96	0.38	0.83	1.21

**2003 AVERAGE CONCENTRATION OF DETECTABLE VOLATILE OZONE PRECURSORS  
PHOTOCHEMICAL ASSESSMENT MONITORING STATION (PAMS) TYPE II - Math & Science  
Center (cont.)**

Concentrations are in ppbC

<b>Parameter</b>	<b>Compound Name</b>	<b>Num</b>	<b>Min</b>	<b>Max</b>	<b>Median</b>	<b>Average</b>	<b>StDev</b>
45210	Isopropylbenzene	55	0.05	1.03	0.08	0.14	0.15
45209	n-propylbenzene	55	0.05	1.58	0.26	0.28	0.21
45212	m-ethyltoluene	55	0.05	2.29	0.73	0.86	0.50
45213	p-ethyltoluene	55	0.18	2.99	0.46	0.54	0.40
45207	1,3,5-trimethylbenzene	55	0.08	3.24	0.29	0.39	0.43
45211	o-ethyltoluene	55	0.18	2.40	0.42	0.55	0.43
45208	1,2,4-trimethylbenzene	55	0.36	4.47	0.91	1.16	0.86
43238	n-decane	55	0.18	10.59	0.42	0.76	1.41
45225	1,2,3-trimethylbenzene	55	0.11	5.06	0.36	0.99	1.27
45218	p-diethylbenzene	55	0.05	0.57	0.21	0.23	0.12
45219	p-diethylbenzene	55	0.05	0.98	0.26	0.31	0.21
43954	n-undecane	55	0.18	6.07	0.38	0.54	0.79
43141	n-dodecane	55	0.05	1.68	0.31	0.47	0.39
<b>43000</b>	<b>PAMHC</b>	55	30.89	184.49	64.81	78.25	40.11
<b>43102</b>	<b>TNMOC</b>	55	73.80	433.04	136.51	154.52	68.59

**2003 AVERAGE CONCENTRATION OF DETECTABLE VOLATILE OZONE PRECURSORS  
PHOTOCHEMICAL ASSESSMENT MONITORING STATION (PAMS) Reduced TYPE IIA -**

**Lee District Park**

Concentrations are in ppbC

Parameter	Compound Name	Num	Min	Max	Median	Average	StDev
43203	Ethylene	60	0.82	6.38	2.10	2.37	1.30
43206	Acetylene	60	0.84	7.08	2.41	2.98	1.60
43202	Ethane	60	2.72	18.41	6.64	7.03	3.32
43205	Propylene	60	0.35	2.50	0.78	0.96	0.49
43204	Propane	60	1.88	11.43	5.23	5.48	2.38
43214	Isobutane	60	0.62	3.81	1.53	1.69	0.78
43280	1-butene	60	0.14	2.33	0.57	0.63	0.41
43212	n-butane	60	0.83	11.51	3.45	3.88	2.71
43216	t-2-butene	60	0.05	0.33	0.18	0.18	0.08
43217	c-2-butene	60	0.05	0.41	0.16	0.17	0.09
43221	Isopentane	60	1.45	7.26	3.11	3.53	1.51
43224	1-pentene	60	0.05	0.65	0.32	0.33	0.10
43220	n-pentane	60	0.77	3.45	1.44	1.61	0.65
43243	Isoprene	60	0.05	13.01	0.30	1.95	3.44
43226	t-2-pentene	60	0.05	0.49	0.17	0.18	0.12
43227	c-2-pentene	60	0.05	0.70	0.15	0.19	0.14
43244	2,2-dimethylbutane	60	0.05	0.73	0.25	0.27	0.13
43242	Cyclopentane	60	0.07	0.50	0.24	0.25	0.10
43284	2,3-dimethylbutane	60	0.05	1.02	0.34	0.39	0.18
43285	2-methylpentane	60	0.48	3.40	0.98	1.07	0.54
43230	3-methylpentane	60	0.30	2.53	0.75	0.83	0.38
43245	1-Hexene	60	0.18	3.36	0.59	0.76	0.64
43231	n-hexane	60	0.35	2.53	0.77	0.86	0.42
43262	Methylcyclopentane	60	0.24	1.46	0.49	0.54	0.24
43247	2,4-dimethylpentane	60	0.05	0.59	0.23	0.24	0.12
45201	Benzene	60	1.11	3.74	1.80	1.94	0.60
43248	Cyclohexane	60	0.05	0.53	0.23	0.26	0.10
43263	2-methylhexane	60	0.20	1.20	0.37	0.42	0.20
43291	2,3-dimethylpentane	60	0.05	0.69	0.25	0.27	0.12
43249	3-methylhexane	60	0.21	1.77	0.58	0.62	0.30
43250	2,2,4-trimethylpentane	60	0.29	3.56	0.88	0.98	0.58
43232	n-heptane	60	0.18	1.03	0.38	0.42	0.17
43261	Methylcyclohexane	60	0.05	0.62	0.24	0.26	0.13
43252	2,3,4-trimethylpentane	60	0.05	1.31	0.37	0.42	0.22
45202	Toluene	60	1.13	8.09	2.88	3.34	1.48
43960	2-methylheptane	60	0.05	0.38	0.18	0.19	0.09
43253	3-methylheptane	60	0.05	0.51	0.21	0.21	0.11
43233	n-octane	60	0.05	0.69	0.26	0.27	0.14
45203	Ethylbenzene	60	0.26	1.24	0.54	0.62	0.25
45109	m/p-xylene	60	0.78	3.80	1.56	1.74	0.72

**2003 AVERAGE CONCENTRATION OF DETECTABLE VOLATILE OZONE PRECURSORS  
PHOTOCHEMICAL ASSESSMENT MONITORING STATION (PAMS) Reduced TYPE IIA -**

**Lee District Park (cont.)**

Concentrations are in ppbC

<b>Parameter</b>	<b>Compound Name</b>	<b>Num</b>	<b>Min</b>	<b>Max</b>	<b>Median</b>	<b>Average</b>	<b>StDev</b>
45220	Styrene	60	0.13	0.49	0.28	0.29	0.09
45204	o-xylene	60	0.27	1.46	0.63	0.69	0.29
43235	n-nonane	60	0.05	2.99	0.27	0.53	0.71
45210	Isopropylbenzene	60	0.05	0.35	0.05	0.09	0.06
45209	n-propylbenzene	60	0.05	0.47	0.19	0.19	0.09
45212	m-ethyltoluene	60	0.05	1.33	0.56	0.59	0.24
45213	p-ethyltoluene	60	0.19	0.79	0.33	0.37	0.13
45207	1,3,5-trimethylbenzene	60	0.09	0.58	0.26	0.28	0.12
45211	o-ethyltoluene	60	0.16	0.64	0.30	0.33	0.13
45208	1,2,4-trimethylbenzene	60	0.40	1.75	0.68	0.80	0.33
43238	n-decane	60	0.16	1.26	0.35	0.40	0.21
45225	1,2,3-trimethylbenzene	52	0.09	2.24	0.26	0.43	0.46
45218	p-diethylbenzene	60	0.05	0.37	0.16	0.17	0.09
45219	p-diethylbenzene	60	0.05	0.54	0.19	0.19	0.09
43954	n-undecane	60	0.05	0.72	0.31	0.33	0.11
43141	n-dodecane	60	0.05	0.52	0.22	0.24	0.09
<b>43000</b>	<b>PAMHC</b>	60	30.49	107.37	51.04	56.06	19.52
<b>43102</b>	<b>TNMOC</b>	60	59.21	162.16	86.04	92.09	25.51

**2003 AVERAGE CONCENTRATION OF DETECTABLE VOLATILE OZONE PRECURSORS  
PHOTOCHEMICAL ASSESSMENT MONITORING STATION ADDITIONAL VOC PAMS Sampling -  
National Oceanic and Atmospheric Administration (NOAA) Site**

Concentrations are in ppbC

Parameter	Compound Name	Num	Min	Max	Median	Average	StDev
43203	Ethylene	58	0.91	9.79	2.32	2.84	1.66
43206	Acetylene	58	1.00	10.67	2.84	3.52	2.09
43202	Ethane	58	1.85	40.55	6.88	9.20	7.25
43205	Propylene	58	0.46	4.51	1.13	1.26	0.65
43204	Propane	58	1.25	14.41	5.38	6.14	2.97
43214	Isobutane	58	0.53	40.06	1.85	2.74	5.12
43280	1-butene	58	0.29	2.88	0.81	0.93	0.54
43212	n-butane	58	0.81	14.55	3.89	4.64	3.39
43216	t-2-butene	58	0.05	0.69	0.20	0.24	0.16
43217	c-2-butene	58	0.05	0.59	0.20	0.22	0.12
43221	Isopentane	58	1.69	10.17	4.77	4.89	1.97
43224	1-pentene	58	0.05	0.96	0.39	0.42	0.17
43220	n-pentane	58	0.79	6.25	1.78	2.07	1.02
43243	Isoprene	58	0.05	2.06	0.32	0.59	0.58
43226	t-2-pentene	58	0.05	0.78	0.28	0.29	0.15
43227	c-2-pentene	58	0.05	0.73	0.23	0.27	0.15
43244	2,2-dimethylbutane	58	0.05	0.80	0.31	0.35	0.15
43242	Cyclopentane	58	0.05	0.73	0.25	0.28	0.15
43284	2,3-dimethylbutane	58	0.05	1.02	0.44	0.47	0.20
43285	2-methylpentane	58	0.51	3.04	1.33	1.38	0.55
43230	3-methylpentane	58	0.40	2.55	1.02	1.09	0.42
43245	1-Hexene	58	0.12	3.76	0.49	0.85	0.82
43231	n-hexane	58	0.47	5.50	1.08	1.30	0.79
43262	Methylcyclopentane	58	0.05	2.07	0.68	0.71	0.34
43247	2,4-dimethylpentane	58	0.05	0.75	0.29	0.31	0.15
45201	Benzene	58	0.89	3.55	1.94	2.05	0.67
43248	Cyclohexane	58	0.05	2.19	0.26	0.34	0.29
43263	2-methylhexane	58	0.05	1.95	0.53	0.57	0.29
43291	2,3-dimethylpentane	58	0.05	0.70	0.31	0.34	0.15
43249	3-methylhexane	58	0.05	2.06	0.79	0.84	0.38
43250	2,2,4-trimethylpentane	58	0.25	2.38	1.04	1.16	0.51
43232	n-heptane	58	0.21	1.69	0.50	0.55	0.25
43261	Methylcyclohexane	58	0.05	0.91	0.30	0.33	0.16
43252	2,3,4-trimethylpentane	58	0.13	0.93	0.43	0.46	0.20
45202	Toluene	58	1.14	8.47	3.46	3.80	1.43
43960	2-methylheptane	58	0.05	0.60	0.24	0.25	0.11
43253	3-methylheptane	58	0.05	0.84	0.26	0.29	0.17
43233	n-octane	58	0.05	1.19	0.34	0.37	0.20
45203	Ethylbenzene	58	0.24	2.30	0.73	0.82	0.37
45109	m/p-xylene	58	0.71	7.60	2.08	2.35	1.22
45220	Styrene	58	0.09	1.01	0.26	0.32	0.19
45204	o-xylene	58	0.27	2.06	0.79	0.86	0.36

**2003 AVERAGE CONCENTRATION OF DETECTABLE VOLATILE OZONE PRECURSORS  
PHOTOCHEMICAL ASSESSMENT MONITORING STATION ADDITIONAL VOC PAMS Sampling -  
National Oceanic and Atmospheric Administration (NOAA) Site (cont.)**

Concentrations are in ppbC

Parameter	Compound Name	Num	Min	Max	Median	Average	StDev
43235	n-nonane	58	0.05	4.08	0.36	0.76	0.91
45210	Isopropylbenzene	58	0.05	0.42	0.08	0.11	0.09
45209	n-propylbenzene	58	0.05	0.69	0.25	0.28	0.12
45212	m-ethyltoluene	58	0.28	2.46	0.86	0.90	0.40
45213	p-ethyltoluene	58	0.23	1.57	0.48	0.53	0.24
45207	1,3,5-trimethylbenzene	58	0.11	1.09	0.37	0.39	0.20
45211	o-ethyltoluene	58	0.15	1.43	0.41	0.44	0.23
45208	1,2,4-trimethylbenzene	58	0.24	3.15	1.19	1.26	0.60
43238	n-decane	58	0.22	1.63	0.49	0.59	0.36
45225	1,2,3-trimethylbenzene	58	0.05	2.75	0.37	0.53	0.51
45218	p-diethylbenzene	58	0.05	0.55	0.19	0.23	0.12
45219	p-diethylbenzene	58	0.05	0.91	0.24	0.28	0.19
43954	n-undecane	58	0.19	1.90	0.46	0.53	0.31
43141	n-dodecane	58	0.16	0.67	0.32	0.35	0.14
<b>43000</b>	<b>PAMHC</b>	58	28.60	155.01	64.17	69.82	28.54
<b>43102</b>	<b>TNMOC</b>	58	65.89	246.64	120.81	124.67	40.40

### 3 Hour Carbonyl Sampling - Math & Science Center - 2003 Summary Statistical Analysis

Unit of Concentration: ppbV

Site	Parameter	Compound Name	Num	Min	Max	Median	Average	StDev
<b>5:00 AM - 8:00 AM</b>	43502	Formaldehyde	30	1.243	8.125	2.219	2.614	1.477
	43503	Acetaldehyde	30	0.444	2.004	0.781	0.877	0.336
	43504	Propionaldehyde	30	0.026	0.700	0.059	0.190	0.170
	43505	Acrolein	30	0.020	0.090	0.057	0.047	0.019
	43551	Acetone	30	1.200	5.341	2.462	2.639	0.850
	43552	Methyl Ethyl Ketone	30	0.032	0.894	0.287	0.320	0.189
	43560	Methyl Isobutyl Ketone	30	0.003	0.051	0.024	0.028	0.021
<b>8:00 AM - 11:00 AM</b>	43502	Formaldehyde	30	1.345	11.728	3.636	4.395	2.539
	43503	Acetaldehyde	30	0.460	1.942	0.924	1.031	0.386
	43504	Propionaldehyde	30	0.026	0.551	0.059	0.177	0.159
	43505	Acrolein	30	0.007	0.084	0.057	0.043	0.020
	43551	Acetone	30	1.277	5.284	2.730	2.914	0.975
	43552	Methyl Ethyl Ketone	30	0.086	1.438	0.339	0.408	0.277
	43560	Methyl Isobutyl Ketone	30	0.006	0.050	0.036	0.029	0.020
<b>11:00 AM - 2:00 PM</b>	43502	Formaldehyde	30	1.705	11.248	5.213	5.776	2.692
	43503	Acetaldehyde	30	0.449	1.822	1.081	1.061	0.328
	43504	Propionaldehyde	30	0.026	0.532	0.059	0.150	0.143
	43505	Acrolein	30	0.017	0.057	0.034	0.038	0.018
	43551	Acetone	30	1.531	5.943	2.956	3.167	0.970
	43552	Methyl Ethyl Ketone	30	0.162	1.090	0.378	0.389	0.191
	43560	Methyl Isobutyl Ketone	30	0.007	0.050	0.039	0.030	0.020
<b>2:00 PM - 5:00 PM</b>	43502	Formaldehyde	30	1.429	11.498	5.764	5.755	2.572
	43503	Acetaldehyde	30	0.337	1.709	1.091	1.066	0.325
	43504	Propionaldehyde	30	0.026	0.532	0.059	0.170	0.157
	43505	Acrolein	30	0.017	0.058	0.031	0.038	0.017
	43551	Acetone	30	1.338	5.191	3.039	3.216	0.899
	43552	Methyl Ethyl Ketone	30	0.049	0.615	0.351	0.359	0.149
	43560	Methyl Isobutyl Ketone	30	0.007	0.108	0.050	0.035	0.025



**Detectable VOC In 24-Hour Canister Samples**  
**GC/MSD - Math & Science Center - Henrico County, VA**  
**January 1 to December 31, 2003 - Concentrations are in ppbV**

Parameter	Compound Name	Num	Min	Max	Median	Average	StDev
43823	Dichlorodifluoromethane	55	0.46	0.62	0.53	0.527	0.034
43801	Chloromethane	55	0.44	0.64	0.54	0.534	0.042
43208	Freon 114	55	0.01	0.03	0.02	0.018	0.006
43860	Vinyl Chloride	55	0.01	0.01	0.01	0.010	0.000
43218	1,3-Butadiene	55	0.01	0.26	0.07	0.083	0.066
43819	Bromomethane	55	0.01	0.10	0.01	0.016	0.017
43812	Chloroethane	55	0.01	0.03	0.01	0.008	0.005
43811	Trichlorofluoromethane	55	0.22	0.43	0.25	0.263	0.039
43826	1,1-Dichloroethylene	55	0.01	0.02	0.01	0.006	0.002
43802	Dichloromethane	55	0.04	0.24	0.08	0.092	0.040
43207	Freon 113	55	0.06	0.11	0.08	0.081	0.010
43813	1,1-Dichloroethane	55	0.00	0.01	0.00	0.003	0.002
43839	cis-1,2-Dichloroethene	55	0.01	0.01	0.01	0.010	0.000
43803	Chloroform	55	0.01	0.04	0.02	0.020	0.008
43815	Ethylene dichloride	55	0.01	0.02	0.01	0.009	0.004
43814	Methyl chloroform	55	0.02	0.11	0.03	0.030	0.012
45201	Benzene	55	0.08	0.73	0.24	0.284	0.143
43804	Carbon Tetrachloride	55	0.06	0.09	0.08	0.083	0.007
43829	1,2-Dichloropropane	55	0.00	0.01	0.00	0.004	0.002
43824	Trichloroethylene	55	0.01	0.02	0.01	0.011	0.003
43831	cis-1,3-Dichloropropylene	55	0.01	0.01	0.01	0.010	0.000
43830	trans-1,3-Dichloropropylene	55	0.01	0.01	0.01	0.010	0.000
43820	1,1,2-Trichloroethane	55	0.01	0.01	0.01	0.010	0.000
45202	Toluene	55	0.11	1.40	0.37	0.463	0.306
43843	Ethylene Dibromide	55	0.01	0.01	0.01	0.005	0.001
43817	Tetrachloroethylene	55	0.01	0.23	0.03	0.034	0.033
45801	Chlorobenzene	55	0.00	0.01	0.00	0.005	0.004
45203	Ethylbenzene	55	0.02	0.21	0.05	0.059	0.039
45109	m/p Xylene	55	0.03	0.64	0.11	0.154	0.123
45220	Styrene	55	0.01	0.20	0.03	0.043	0.032
43818	1,1,2,2-Tetrachloroethane	55	0.01	0.02	0.01	0.010	0.001
45204	o-Xylene	55	0.01	0.24	0.05	0.063	0.043
45213	p-Ethyltoluene	55	0.01	0.09	0.03	0.032	0.020
45207	1,3,5-Trimethylbenzene	55	0.01	0.08	0.02	0.025	0.016
45208	1,2,4-Trimethylbenzene	55	0.02	0.29	0.07	0.083	0.057
45806	1,3-Dichlorobenzene	55	0.00	0.02	0.01	0.008	0.005
45807	1,4-Dichlorobenzene	55	0.01	0.10	0.03	0.029	0.019
45805	1,2-Dichlorobenzene	55	0.00	0.02	0.01	0.008	0.004
45810	1,2,4-Trichlorobenzene	55	0.00	0.03	0.01	0.013	0.008
43844	Hexachlorobutadiene	55	0.01	0.02	0.01	0.011	0.004

**Detectable VOC In 24-Hour Canister Samples**  
**GC/MSD - Lee District Park - Fairfax County, VA**  
**January 1 to December 31, 2003 - Concentrations are in ppbV**

Parameter	Compound Name	Num	Min	Max	Median	Average	StDev
43823	Dichlorodifluoromethane	61	0.41	0.61	0.53	0.524	0.037
43801	Chloromethane	61	0.40	0.64	0.53	0.526	0.050
43208	Freon 114	61	0.01	0.05	0.02	0.018	0.007
43860	Vinyl Chloride	61	0.01	0.01	0.01	0.010	0.000
43218	1,3-Butadiene	61	0.01	0.23	0.05	0.057	0.042
43819	Bromomethane	61	0.01	0.08	0.01	0.016	0.013
43812	Chloroethane	61	0.01	0.02	0.01	0.008	0.004
43811	Trichlorofluoromethane	61	0.19	0.29	0.24	0.247	0.018
43826	1,1-Dichloroethylene	61	0.01	0.03	0.01	0.006	0.004
43802	Dichloromethane	61	0.04	0.15	0.07	0.077	0.024
43207	Freon 113	61	0.06	0.10	0.08	0.079	0.008
43813	1,1-Dichloroethane	61	0.00	0.03	0.00	0.003	0.004
43839	cis-1,2-Dichloroethene	61	0.01	0.01	0.01	0.010	0.000
43803	Chloroform	61	0.01	0.06	0.02	0.023	0.010
43815	Ethylene dichloride	61	0.01	0.04	0.01	0.009	0.006
43814	Methyl chloroform	61	0.02	0.06	0.03	0.029	0.007
45201	Benzene	61	0.11	0.45	0.23	0.237	0.083
43804	Carbon Tetrachloride	61	0.06	0.12	0.08	0.084	0.011
43829	1,2-Dichloropropane	61	0.00	0.01	0.00	0.004	0.001
43824	Trichloroethylene	61	0.01	0.02	0.01	0.010	0.002
43831	cis-1,3-Dichloropropylene	61	0.01	0.02	0.01	0.010	0.001
43830	trans-1,3-Dichloropropylene	61	0.01	0.01	0.01	0.010	0.000
43820	1,1,2-Trichloroethane	61	0.01	0.02	0.01	0.010	0.001
45202	Toluene	61	0.07	1.08	0.28	0.324	0.192
43843	Ethylene Dibromide	61	0.01	0.02	0.01	0.005	0.002
43817	Tetrachloroethylene	61	0.01	0.12	0.04	0.044	0.025
45801	Chlorobenzene	61	0.00	0.03	0.00	0.004	0.005
45203	Ethylbenzene	61	0.01	0.12	0.04	0.046	0.021
45109	m/p Xylene	61	0.02	0.39	0.10	0.116	0.069
45220	Styrene	61	0.01	0.08	0.02	0.028	0.016
43818	1,1,2,2-Tetrachloroethane	61	0.01	0.02	0.01	0.010	0.002
45204	o-Xylene	61	0.01	0.14	0.04	0.043	0.024
45213	p-Ethyltoluene	61	0.00	0.05	0.02	0.021	0.011
45207	1,3,5-Trimethylbenzene	61	0.00	0.05	0.02	0.018	0.010
45208	1,2,4-Trimethylbenzene	61	0.00	0.15	0.04	0.050	0.029
45806	1,3-Dichlorobenzene	61	0.00	0.02	0.01	0.007	0.005
45807	1,4-Dichlorobenzene	61	0.00	0.06	0.02	0.019	0.013
45805	1,2-Dichlorobenzene	61	0.00	0.02	0.01	0.009	0.005
45810	1,2,4-Trichlorobenzene	61	0.00	0.02	0.01	0.010	0.006
43844	Hexachlorobutadiene	61	0.01	0.02	0.01	0.011	0.002

**Detectable VOC In 24-Hour Canister Samples**  
**GC/MSD - NOAA Site - Norfolk, VA**  
**January 1 to December 31, 2003 - Concentrations are in ppbV**

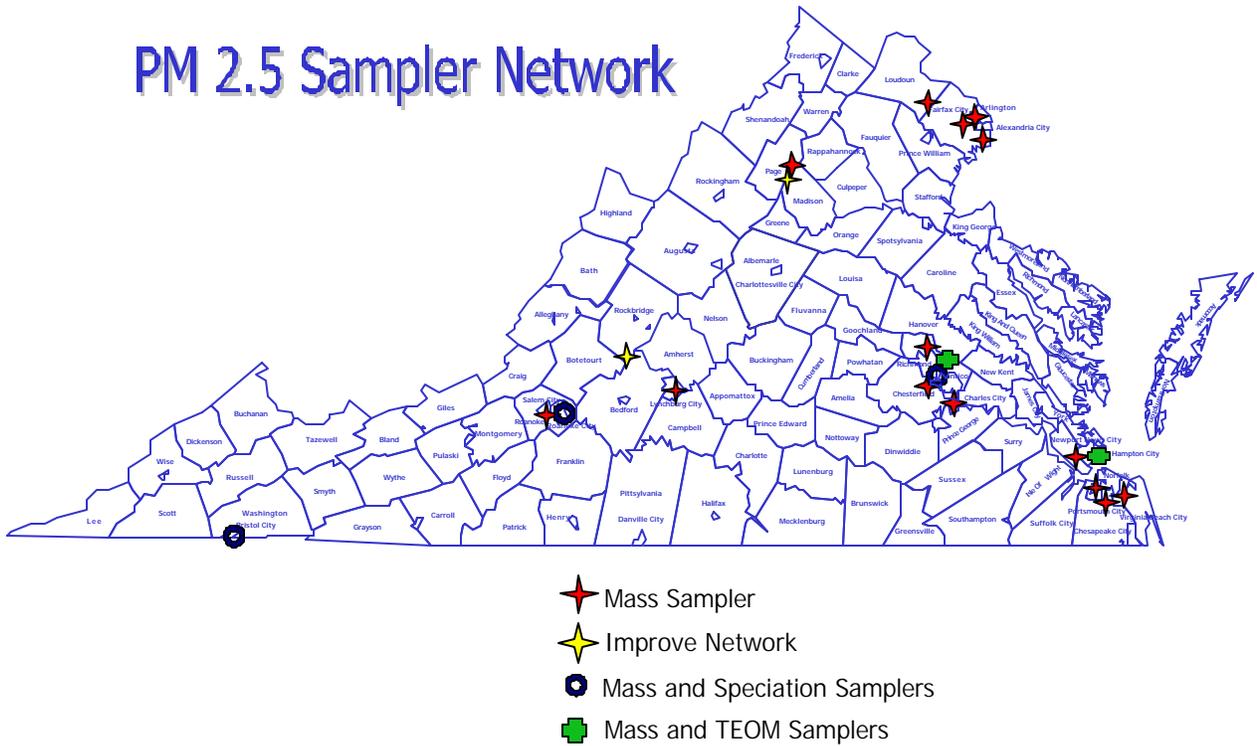
Parameter	Compound Name	Num	Min	Max	Median	Average	StDev
43823	Dichlorodifluoromethane	58	0.40	0.67	0.53	0.528	0.039
43801	Chloromethane	58	0.44	0.68	0.53	0.534	0.044
43208	Freon 114	58	0.01	0.03	0.02	0.019	0.006
43860	Vinyl Chloride	58	0.01	0.08	0.01	0.011	0.009
43218	1,3-Butadiene	58	0.01	0.18	0.08	0.079	0.047
43819	Bromomethane	58	0.01	0.04	0.01	0.013	0.007
43812	Chloroethane	58	0.01	0.02	0.01	0.008	0.004
43811	Trichlorofluoromethane	58	0.21	0.35	0.25	0.253	0.023
43826	1,1-Dichloroethylene	58	0.01	0.04	0.01	0.008	0.006
43802	Dichloromethane	58	0.03	0.66	0.07	0.093	0.106
43207	Freon 113	58	0.05	0.09	0.08	0.079	0.008
43813	1,1-Dichloroethane	58	0.00	0.01	0.00	0.003	0.001
43839	cis-1,2-Dichloroethene	58	0.01	0.01	0.01	0.010	0.000
43803	Chloroform	58	0.01	0.03	0.02	0.018	0.007
43815	Ethylene dichloride	58	0.01	0.02	0.01	0.008	0.003
43814	Methyl chloroform	58	0.02	0.04	0.03	0.028	0.005
45201	Benzene	58	0.11	0.49	0.24	0.255	0.091
43804	Carbon Tetrachloride	58	0.05	0.09	0.08	0.081	0.009
43829	1,2-Dichloropropane	58	0.00	0.01	0.00	0.004	0.002
43824	Trichloroethylene	58	0.01	0.03	0.01	0.013	0.005
43831	cis-1,3-Dichloropropylene	58	0.01	0.05	0.01	0.011	0.005
43830	trans-1,3-Dichloropropylene	58	0.01	0.03	0.01	0.010	0.003
43820	1,1,2-Trichloroethane	58	0.01	0.01	0.01	0.010	0.000
45202	Toluene	58	0.12	0.87	0.38	0.391	0.156
43843	Ethylene Dibromide	58	0.01	0.01	0.01	0.005	0.001
43817	Tetrachloroethylene	58	0.01	0.08	0.03	0.031	0.017
45801	Chlorobenzene	58	0.00	0.02	0.00	0.004	0.004
45203	Ethylbenzene	58	0.01	0.18	0.06	0.066	0.029
45109	m/p Xylene	58	0.02	0.67	0.17	0.180	0.106
45220	Styrene	58	0.01	0.09	0.03	0.033	0.015
43818	1,1,2,2-Tetrachloroethane	58	0.01	0.01	0.01	0.010	0.000
45204	o-Xylene	58	0.01	0.15	0.07	0.067	0.028
45213	p-Ethyltoluene	58	0.00	0.14	0.03	0.035	0.022
45207	1,3,5-Trimethylbenzene	58	0.00	0.14	0.03	0.030	0.019
45208	1,2,4-Trimethylbenzene	58	0.01	0.41	0.09	0.096	0.061
45806	1,3-Dichlorobenzene	58	0.00	0.02	0.01	0.008	0.004
45807	1,4-Dichlorobenzene	58	0.00	0.05	0.02	0.020	0.011
45805	1,2-Dichlorobenzene	58	0.00	0.03	0.01	0.009	0.005
45810	1,2,4-Trichlorobenzene	58	0.00	0.11	0.01	0.015	0.016
43844	Hexachlorobutadiene	58	0.01	0.04	0.01	0.012	0.005

## 24 Hour Carbonyl Sampling 2003 Summary Statistical Analysis

Units of Concentration: ppbV

Site	Parameter	Compound Name	#N	Min	Max	Median	Average	StDev
<b>Lee Park</b>	43502	Formaldehyde	59	0.378	9.900	1.848	2.240	1.505
	43503	Acetaldehyde	59	0.388	1.820	0.882	0.901	0.260
	43504	Propionaldehyde	59	0.013	0.615	0.302	0.255	0.184
	43505	Acrolein	59	0.010	0.172	0.043	0.053	0.039
	43551	Acetone	59	0.511	4.799	1.625	1.812	0.950
	43552	Methyl Ethyl Ketone	59	0.111	0.674	0.268	0.286	0.129
	43560	Methyl Isobutyl Ketone	59	0.004	0.260	0.011	0.024	0.043
<b>NOAA</b>	43502	Formaldehyde	57	0.088	4.298	1.875	1.938	0.853
	43503	Acetaldehyde	57	0.205	1.447	0.792	0.838	0.255
	43504	Propionaldehyde	57	0.013	0.432	0.243	0.231	0.128
	43505	Acrolein	57	0.005	0.142	0.029	0.042	0.033
	43551	Acetone	57	0.030	4.548	1.258	1.601	1.086
	43552	Methyl Ethyl Ketone	57	0.057	0.620	0.234	0.259	0.131
	43560	Methyl Isobutyl Ketone	57	0.004	0.263	0.018	0.026	0.038
<b>Math &amp; Science Center</b>	43502	Formaldehyde	59	0.474	6.852	1.747	2.150	1.256
	43503	Acetaldehyde	59	0.382	1.584	0.842	0.878	0.264
	43504	Propionaldehyde	59	0.013	0.368	0.142	0.139	0.118
	43505	Acrolein	59	0.010	0.182	0.030	0.050	0.041
	43551	Acetone	59	0.747	5.096	1.873	1.930	0.945
	43552	Methyl Ethyl Ketone	59	0.010	0.847	0.279	0.292	0.151
	43560	Methyl Isobutyl Ketone	59	0.003	0.026	0.011	0.014	0.009

# PM 2.5 Sampler Network



**PM<sub>2.5</sub>** is particulate matter (PM) that is less than or equal to 2.5 micrometers in aerometric diameter. Particles originate from a variety of anthropogenic stationary and mobile sources as well as from natural sources. Particles may be emitted directly or formed in the atmosphere by transformation of gaseous emissions such as sulfur oxides (SO<sub>x</sub>), nitrogen oxides (NO<sub>x</sub>), and Volatile Organic Compounds (VOC). The chemical and physical properties of particulate matter vary greatly with time, region, meteorology, and source category, thus complicating the assessment of health and welfare effects.

PM<sub>2.5</sub> standards were implemented by EPA to “provide increased protection against a wide range of PM-related health effects”. These health effects include but are not limited to “premature mortality, decreased lung function, increased respiratory symptoms and disease such as asthma, and alterations in lung tissue”. The standards are “requisite to protect the public welfare from any known or anticipated adverse effects associated with the presence of the pollutant in the ambient air. These effects include but are not limited to effects on soils, water, crops, vegetation, manmade materials, animals, wildlife, weather, visibility, and climate, damage and deterioration of property, and hazards to transportation, as well as effects on economic values and on personal comfort and well being”.

The Virginia DEQ PM<sub>2.5</sub> monitoring network utilizes three different types of particulate monitoring samplers:

PM<sub>2.5</sub> 24-hour Mass Sampler: This Federal Reference Method (FRM) sampler collects particulate matter on a stretched Teflon filter media. Three samplers (Richmond, Chesapeake, and Fairfax) collect 24-hour samples every day. The rest of these samplers collect 24-hour samples on a one-in-three-day schedule. Filters are retrieved from the field and shipped via courier to the Virginia Division of Consolidated Laboratories in Richmond. Once at the laboratory, the filters are equilibrated for a minimum of 24 hours prior to the final weighing.

PM<sub>2.5</sub> 24-hour Speciation Sampler: This sampler collects particulate matter on nylon, Teflon, and quartz filters, in three sampling modules. These modules are picked up by the operator after the sampling period and shipped refrigerated to the EPA Contract Laboratory. The lab analyzes the filters for mass loading, trace elements (such as: aluminum, antimony, arsenic, barium, bromine, zirconium), cations (ammonium, potassium, sodium), anions (nitrate, sulfate), and carbons (carbonate carbon, elemental carbon, organic carbon). The Richmond speciation monitor operates on a one-in-three-day sampling schedule. The Roanoke and Bristol speciation monitors operate on a one-in-six day sampling schedule.

PM<sub>2.5</sub> Continuous Monitor: This sampler collects particulate samples on a continuous basis, and data are compiled into hourly averages. The sampler utilizes a Tapered Element Oscillating Microbalance (TEOM) in the sampling design. TEOM samplers are operated by Virginia DEQ in Hampton and Henrico County, and by the Fairfax County Health Department in Fairfax County.

In addition to the PM<sub>2.5</sub> network operated by the DEQ, the National Park Service and the USDA Forest Service operated PM<sub>2.5</sub> samplers at Big Meadows and in Rockbridge Co. as part of the IMPROVE (Interagency Monitoring of Protected Visual Environments) network. This network employs different sampling methods than those used by the DEQ. Data for the IMPROVE network can be found on the internet at <http://vista.cira.colostate.edu/improve>.

**VIRGINIA 2003**  
**PM2.5 PARTICULATE MATTER SUMMARY BY REGION**  
**METHOD CODE 118 - GRAVIMETRIC, R & P MODEL 2025 SEQUENTIAL**  
**Micrograms Per Cubic Meter (ug/m3)**

LOCATION/ STATION NO.	24-HOUR SAMPLING				QUARTERLY ARITHMETIC MEAN				ANNUAL ARITH. MEAN	
	NO. OBS.	MAX	2ND MAX	98 <sup>th</sup> PERCENTILE VALUE	I	II	III	IV		
<b>SOUTHWEST REGION</b>										
BRISTOL Highland View Elementary School	101-E	115	53.5	30.9	30.2	12.3	14.2	18.3	10.4	13.8
<b>VALLEY REGION</b>										
LURAY Luray Caverns Airport	29-D	115	40.8	35.0	33.6	13.0	12.6	14.8	9.2	12.4
<b>WEST CENTRAL REGION</b>										
ROANOKE Raleigh Court Library	109-L	119	41.3	32.7	32.0	11.0	13.3	18.4	11.3	13.5
SALEM Market Street Fire Station	110-B	116	41.1	34.2	32.2	11.3	13.8	18.9	11.2	13.8
LYNCHBURG Water Tank on Leesville Road	155-Q*	86	39.7	34.5	34.5	NA	13.1	18.1	9.3	NA
<b>PIEDMONT REGION</b>										
CHESTERFIELD CO. Bensley Armory	71-D	116	43.3	37.9	37.6	11.6	13.6	17.0	12.2	13.6
HENRICO CO. Math & Science Center	72-M	105	43.4	36.5	36.4	12.2	14.0	18.0	11.8	14.0

\* This site is located in the South Central Region, but West Central Region maintains the station.

**VIRGINIA 2003**  
**PM2.5 PARTICULATE MATTER SUMMARY BY REGION**  
**METHOD CODE 118 - GRAVIMETRIC, R & P MODEL 2025 SEQUENTIAL**  
**Micrograms Per Cubic Meter (ug/m3)**

LOCATION/ STATION NO.	24-HOUR SAMPLING				QUARTERLY ARITHMETIC MEAN				ANNUAL ARITH. MEAN	
	NO. OBS.	MAX	2ND MAX	98 <sup>TH</sup> PERCENTILE VALUE	I	II	III	IV		
<b>PIEDMONT REGION (cont.)</b>										
HENRICO CO. Piedmont Regional Office	72-N	116	43.6	34.0	31.7	11.2	12.8	17.0	10.2	12.8
CHARLES CITY CO. Route #608	75-B	113	44.4	38.3	36.0	10.3	13.5	16.0	9.7	12.4
RICHMOND Air Monitoring Office	158-S	348	43.5	43.2	32.7	12.3	13.5	17.0	12.4	13.8
<b>TIDEWATER REGION</b>										
CHESAPEAKE Oscar Smith Stadium	176-R	347	60.0	47.1	31.9	11.7	12.8	14.0	10.8	12.3
HAMPTON Va. School for the Deaf & Blind	179-C	118	56.8	34.2	32.8	11.5	13.6	14.5	10.2	12.4
NEWPORT NEWS Pump Station #103	180-O	114	57.5	32.5	31.2	10.7	13.1	13.5	9.9	11.8
NORFOLK NOAA Facility	181-A1	119	59.8	33.0	31.9	12.3	14.1	14.4	10.3	12.8
VA. BEACH Tidewater Regional Office	184-J	123	62.1	33.4	32.6	12.8	13.5	14.0	10.7	12.7

**VIRGINIA 2003**  
**PM2.5 PARTICULATE MATTER SUMMARY BY REGION**  
**METHOD CODE 118 - GRAVIMETRIC, R & P MODEL 2025 SEQUENTIAL**  
**Micrograms Per Cubic Meter (ug/m3)**

REGION/LOCATION STATION NO.	24-HOUR SAMPLING				QUARTERLY ARITHMETIC MEAN				ANNUAL ARITH. MEAN	
	NO. OBS.	MAX	2ND MAX	98 <sup>TH</sup> PERCENTILE VALUE	I	II	III	IV		
<b>NORTHERN REGION</b>										
LOUDOUN CO. Broad Run High School	38-I	120	52.5	35.9	35.3	11.8	13.6	16.7	10.2	13.1
FAIRFAX CO. Lee District Park	46-B9	347	54.9	38.9	32.6	11.8	13.2	16.9	10.9	13.2
ARLINGTON CO. Aurora Hills Visitors Center	47-T	120	53.7	39.9	39.2	14.0	13.9	17.3	11.4	14.1
FAIRFAX CO. McLean Governmental Center	L-46-A8	106	39.1	34.5	32.9	12.9	12.3	17.8	11.2	13.6
FAIRFAX CO. Mason Governmental Center	L-46-C1	110	54.2	38.8	36.7	12.8	12.8	16.8	10.4	13.2

**VIRGINIA 2003**  
**PM2.5 PARTICULATE MATTER CONCENTRATIONS IN RANGES**  
**METHOD 118 - GRAVIMETRIC, R & P MODEL 2025 SEQUENTIAL**  
**Micrograms Per Cubic Meter (ug/m3)**  
**Sampling Schedule Every Three Days**

LOCATION/ STATION NO.	NO. 24-HR. OBS.	NO. OF 24-HOUR CONCENTRATIONS IN RANGES							
		0 to 15	16 to 30	31 to 50	51 to 70	71 to 90	91 to 110	>110	
<b>SOUTHWEST REGION</b>									
BRISTOL Highland View Elementary School	101-E 115	72	41	1	1	0	0	0	
<b>VALLEY REGION</b>									
LURAY Luray Caverns Airport	29-D 115	80	31	4	0	0	0	0	
<b>WEST CENTRAL REGION</b>									
ROANOKE Raleigh Court Library	109-L 119	79	36	4	0	0	0	0	
SALEM Market Street Fire Station	110-B 116	74	38	4	0	0	0	0	
LYNCHBURG Water Tank on Leesville Road	155-Q 86	56	28	2	0	0	0	0	

**VIRGINIA 2003**  
**PM2.5 PARTICULATE MATTER CONCENTRATIONS IN RANGES**  
**METHOD 118 - GRAVIMETRIC, R & P MODEL 2025 SEQUENTIAL**  
**Micrograms Per Cubic Meter (ug/m3)**  
**Sampling Schedule Every Three Days**

LOCATION/ STATION NO.	NO. 24-HR. OBS.	NO. OF 24-HOUR CONCENTRATIONS IN RANGES							
		0 to 15	16 to 30	31 to 50	51 to 70	71 to 90	91 to 110	>110	
<b>PIEDMONT REGION</b>									
CHESTERFIELD CO. 71-D Bensley Armory	116	82	28	6	0	0	0	0	
HENRICO CO. 72-M Math & Science Center	105	72	29	4	0	0	0	0	
HENRICO CO. 72-N Piedmont Regional Office	116	85	28	3	0	0	0	0	
CHARLES CITY CO. 75-B Route #608	113	85	25	3	0	0	0	0	
RICHMOND 158-S* Air Monitoring Office	348	231	107	10	0	0	0	0	
<b>TIDEWATER REGION</b>									
CHESAPEAKE 176-R* Oscar Smith Middle School	347	260	79	7	1	0	0	0	
HAMPTON 179-C Va. School for the Deaf & Blind	118	86	27	4	1	0	0	0	
NEWPORT NEWS 180-O Pump Station #103	114	86	23	4	1	0	0	0	

\* These samplers run daily.

**VIRGINIA 2003**  
**PM2.5 PARTICULATE MATTER CONCENTRATIONS IN RANGES**  
**METHOD 118 - GRAVIMETRIC, R & P MODEL 2025 SEQUENTIAL**  
**Micrograms Per Cubic Meter (ug/m3)**  
**Sampling Schedule Every Three Days**

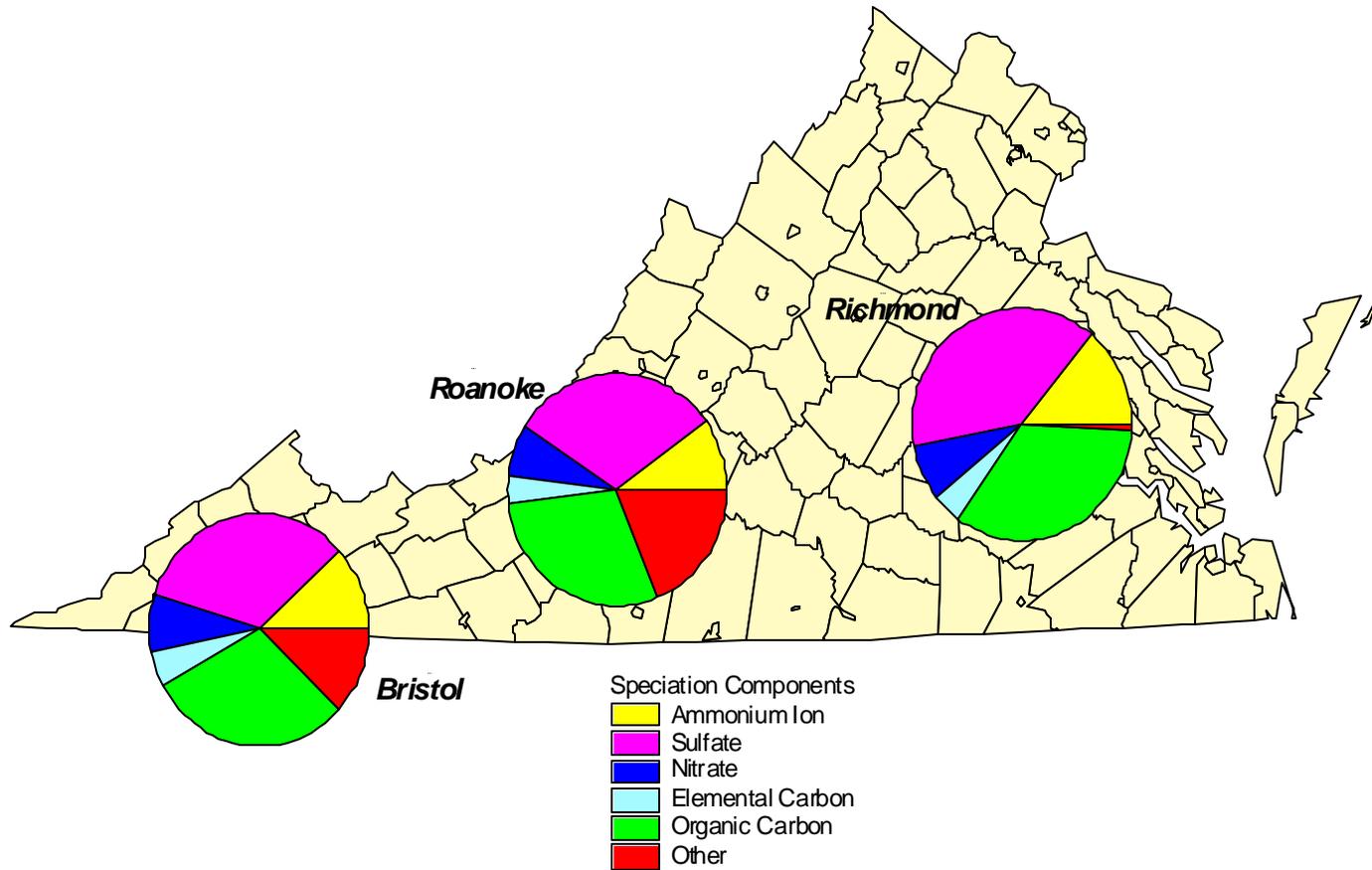
LOCATION/ STATION NO.	NO. 24-HR. OBS.	NO. OF 24-HOUR CONCENTRATIONS IN RANGES							
		0 to 15	16 to 30	31 to 50	51 to 70	71 to 90	91 to 110	>110	
<b>TIDEWATER REGION (continued)</b>									
NORFOLK NOAA Facility	181-A1	119	88	26	4	1	0	0	0
VIRGINIA BEACH Tidewater Regional Office	184-J	123	87	31	4	1	0	0	0
<b>NORTHERN REGION</b>									
LOUDOUN Broad Run High School	38-I	120	85	30	4	1	0	0	0
FAIRFAX CO. Lee District Park	46-B9*	347	249	87	10	1	0	0	0
ARLINGTON CO. Aurora Hills Visitors Center	47-T	120	84	31	4	1	0	0	0

\* This sampler runs daily.

**VIRGINIA 2003**  
**PM2.5 PARTICULATE MATTER CONCENTRATIONS IN RANGES**  
**METHOD 118 - GRAVIMETRIC, R & P MODEL 2025 SEQUENTIAL**  
**Micrograms Per Cubic Meter (ug/m3)**  
**Sampling Schedule Every Three Days**

LOCATION/ STATION NO.	NO. 24-HR. OBS.	NO. OF 24-HOUR CONCENTRATIONS IN RANGES							
		0	16	31	51	71	91	>110	
		to 15	to 30	to 50	to 70	to 90	to 110		
<b>FAIRFAX COUNTY</b>									
FAIRFAX CO. McLean Governmental Center	L-46-A8 106	76	27	3	0	0	0	0	0
FAIRFAX CO. Mason Governmental Center	L-46-C1 110	80	26	3	1	0	0	0	0

# Virginia PM2.5 Speciation Sites 2003 Annual Averages



# 2003 MONITORING SCHEDULE

## 3-Day Monitoring Schedule for PM2.5

January						
Su	M	Tu	W	Th	F	Sa
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

February						
Su	M	Tu	W	Th	F	Sa
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	

March						
Su	M	Tu	W	Th	F	Sa
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

April						
Su	M	Tu	W	Th	F	Sa
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

May						
Su	M	Tu	W	Th	F	Sa
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

June						
Su	M	Tu	W	Th	F	Sa
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

July						
Su	M	Tu	W	Th	F	Sa
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

August						
Su	M	Tu	W	Th	F	Sa
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

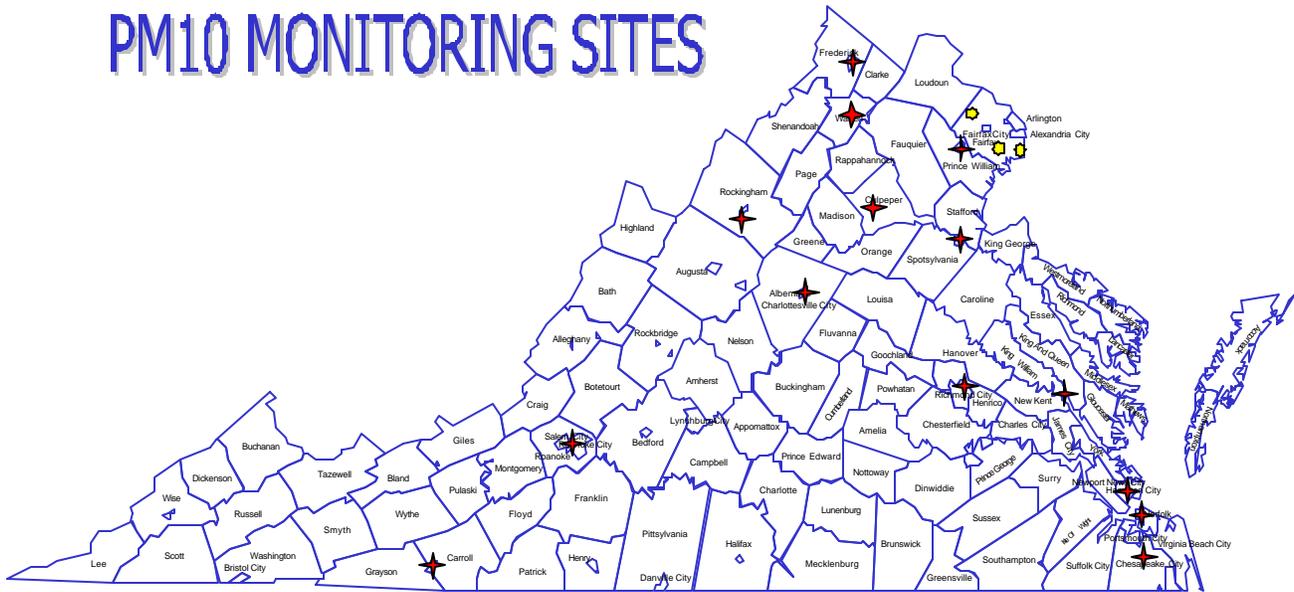
September						
Su	M	Tu	W	Th	F	Sa
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

October						
Su	M	Tu	W	Th	F	Sa
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

November						
Su	M	Tu	W	Th	F	Sa
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

December						
Su	M	Tu	W	Th	F	Sa
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

# PM<sub>10</sub> MONITORING SITES



## Reporting Organizations

- ★ VA Department of Environmental Quality
- ★ Fairfax County Health Department

**PM<sub>10</sub>** is particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers. It is that portion of total suspended particulate that has the capability to penetrate the thoracic region of the human respiratory system. In addition to health effects, particles in this size range can impair visibility, have an effect on climate, and contribute to acidic dry deposition.

PM<sub>10</sub> samples are obtained by drawing ambient air through a specially designed particle size discrimination inlet at 40 cubic feet per minute for 24 hours. The particles in the PM<sub>10</sub> size range are collected on preweighed 8 x 10 inch microquartz filters which are subsequently reweighed to determine the particulate mass. The weighings are performed by the Virginia DEQ, Office of Air Quality Assessment, except for Fairfax County, which perform their own analyses. The results are reported as micrograms per cubic meter (ug/m<sup>3</sup>). The normal sampling schedule is every sixth day from midnight to midnight.

Stations meeting completeness criteria reported at least 75% of the total possible observations in a quarter, and collected enough data to produce four complete quarterly averages in a year.

**VIRGINIA 2003**  
**PM10 PARTICULATE MATTER SUMMARY BY REGION**  
**METHOD CODE 62 - SIZE SELECTIVE INLET, GRAVIMETRIC**  
**Micrograms Per Cubic Meter (ug/m3)**  
**Sampling Schedule Every Six Days**

LOCATION/ STATION NO.	24-HOUR SAMPLING				QUARTERLY ARITHMETIC MEAN				ANNUAL		
	NO. OBS.	MAX	2ND MAX	99 <sup>th</sup> PERCENTILE VALUE	I	II	III	IV	ARITH MEAN	CONC. >150	
<b>SOUTHWEST REGION</b>											
CARROLL CO.                      23-A Galax, Gladeville Elem. School	55	48	33	48	12	18	19	13	15	0	
<b>VALLEY REGION</b>											
HARRISONBURG                      26-E Valley DEQ Office	60	46	38	46	19	21	23	18	20	0	
WARREN CO.                              30-E Front Royal, Memorial Hospital	60	48	36	48	15	18	19	15	17	0	
CHARLOTTESVILLE                      127-B 606 E. Market Street	59	44	30	44	16	19	20	15	17	0	
WINCHESTER                              134-C Winchester Courts Building	61	54	33	54	16	19	20	17	18	0	
<b>WEST CENTRAL REGION</b>											
ROANOKE                                      109-H 101 Cherry Hill Circle	61	65	64	65	26	31	33	31	30	0	

**VIRGINIA 2003**  
**PM10 PARTICULATE MATTER SUMMARY BY REGION**  
**METHOD CODE 62 - SIZE SELECTIVE INLET, GRAVIMETRIC**  
**Micrograms Per Cubic Meter (ug/m3)**  
**Sampling Schedule Every Six Days**

LOCATION/ STATION NO.	24-HOUR SAMPLING				QUARTERLY ARITHMETIC MEAN				ANNUAL		
	NO. OBS.	MAX	2ND MAX	99 <sup>TH</sup> PERCENTILE VALUE	I	II	III	IV	ARITH MEAN	CONC. >150	
<b>PIEDMONT REGION</b>											
KING WILLIAM CO. West Point Elementary School	82-C	60	63	36	63	10	20	21	13	16	0
RICHMOND 5324 Distributor Drive	158-S	60	53	44	53	14	19	21	14	17	0
<b>TIDEWATER REGION</b>											
CHESAPEAKE Oscar Smith Middle School	176-R	53	71	34	71	12	20	19	14	16	0
HAMPTON Va. School for the Deaf & Blind	179-C	57	64	35	64	11	18	19	14	15	0
NORFOLK NOAA Property	181-A1	53	71	31	71	13	21	19	15	17	0
<b>NORTHERN REGION</b>											
FREDERICKSBURG Mercer Elementary School	130-E	51	55	36	55	11	18	22	14	16	0

**VIRGINIA 2003**  
**PM10 PARTICULATE MATTER SUMMARY BY REGION**  
**METHOD CODE 62 - SIZE SELECTIVE INLET, GRAVIMETRIC**  
**Micrograms Per Cubic Meter (ug/m3)**  
**Sampling Schedule Every Six Days**

LOCATION/ STATION NO.	24-HOUR SAMPLING				QUARTERLY ARITHMETIC MEAN				ANNUAL		
	NO. OBS.	MAX	2ND MAX	99 <sup>TH</sup> PERCENTILE VALUE	I	II	III	IV	ARITH MEAN	CONC. >150	
<b>NORTHERN REGION (cont.)</b>											
CULPEPER CO. 42-B Farmington Elementary School	58	50	33	50	13	18	19	14	16	0	
PRINCE WILLIAM CO. 45-A Manassas Health Department	58	56	34	56	14	17	20	13	16	0	
<b>FAIRFAX COUNTY</b>											
FAIRFAX CO. L-46-B3 Mt. Vernon, 2675 Sherwood Hall Ln.	48	64	35	64	15	20	21	14*	18*	0	
FAIRFAX CO. L-46-F Chantilly, Upper Cub Run Treat. Plt.	57	52	33	52	12	18	18	12	15	0	
FAIRFAX CO. L-46-Z Springfield, 6120 Brandon Avenue	59	61	38	61	18	21	21	22	20	0	

\* Did not meet EPA's minimum requirements for data capture.

**VIRGINIA 2003**  
**PM10 PARTICULATE MATTER SUMMARY BY REGION**  
**METHOD 62 - SIZE SELECTIVE INLET, GRAVIMETRIC**  
**Micrograms Per Cubic Meter (ug/m3)**  
**Sampling Schedule Every Six Days**

LOCATION/ STATION NO.	NO. 24-HR. OBS.	NO. OF 24-HOUR CONCENTRATIONS IN RANGES							
		0 to 25	26 to 50	51 to 75	76 to 100	101 to 125	126 to 150	>150	
<b>SOUTHWEST REGION</b>									
CARROLL CO. Galax, Gladeville Elem. School	23-A	55	48	7	0	0	0	0	0
<b>VALLEY REGION</b>									
HARRISONBURG Valley DEQ Office	26-E	60	45	15	0	0	0	0	0
WARREN CO. Front Royal, Memorial Hospital	30-E	60	56	4	0	0	0	0	0
CHARLOTTESVILLE 606 E. Market Street	127-B	59	52	7	0	0	0	0	0
WINCHESTER. Winchester Courts Building	134-C	61	53	7	1	0	0	0	0
<b>WEST CENTRAL REGION</b>									
ROANOKE 101 Cherry Hill Circle	109-H	61	24	30	7	0	0	0	0

**VIRGINIA 2003**  
**PM10 PARTICULATE MATTER SUMMARY BY REGION**  
**METHOD 62 - SIZE SELECTIVE INLET, GRAVIMETRIC**  
**Micrograms Per Cubic Meter (ug/m3)**  
**Sampling Schedule Every Six Days**

LOCATION/ STATION NO.	NO. 24-HR. OBS.	NO. OF 24-HOUR CONCENTRATIONS IN RANGES							
		0 to 25	26 to 50	51 to 75	76 to 100	101 to 125	126 to 150	>150	
<b>PIEDMONT REGION</b>									
KING WILLIAM CO. 82-C West Point Elementary School	60	52	7	1	0	0	0	0	
RICHMOND 158-S 5324 Distributor Drive	60	53	6	1	0	0	0	0	
<b>TIDEWATER REGION</b>									
CHESAPEAKE 176-R Oscar Smith Middle School	53	51	1	1	0	0	0	0	
HAMPTON 179-C Va. School for the Deaf & Blind	57	54	2	1	0	0	0	0	
NORFOLK 181-A1 NOAA Property	53	48	4	1	0	0	0	0	

**VIRGINIA 2003**  
**PM10 PARTICULATE MATTER SUMMARY BY REGION**  
**METHOD 62 - SIZE SELECTIVE INLET, GRAVIMETRIC**  
**Micrograms Per Cubic Meter (ug/m3)**  
**Sampling Schedule Every Six Days**

LOCATION/ STATION NO.	NO. 24-HR. OBS.	NO. OF 24-HOUR CONCENTRATIONS IN RANGES							
		0 to 25	26 to 50	51 to 75	76 to 100	101 to 125	126 to 150	>150	
<b>NORTHERN REGION</b>									
FREDERICKSBURG Mercer Elementary School	130-E	51	45	5	1	0	0	0	0
CULPEPER CO. Farmington Elementary School	42-B	58	53	5	0	0	0	0	0
PRINCE WILLIAM CO. Manassas Health Department	45-A	58	53	4	1	0	0	0	0
<b>FAIRFAX COUNTY</b>									
FAIRFAX CO. Mt. Vernon, 2675 Sherwood Hall Ln.	L-46-B3	48	40	7	1	0	0	0	0
FAIRFAX CO. Chantilly, Upper Cub Run Treat. Plt.	L-46-F	57	54	2	1	0	0	0	0
FAIRFAX CO. Springfield, 6120 Brandon Avenue	L-46-Z	59	47	11	1	0	0	0	0

# 2003 MONITORING SCHEDULE

## 6-Day Monitoring Schedule for PM10

January						
Su	M	Tu	W	Th	F	Sa
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

February						
Su	M	Tu	W	Th	F	Sa
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	

March						
Su	M	Tu	W	Th	F	Sa
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

April						
Su	M	Tu	W	Th	F	Sa
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

May						
Su	M	Tu	W	Th	F	Sa
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

June						
Su	M	Tu	W	Th	F	Sa
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

July						
Su	M	Tu	W	Th	F	Sa
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

August						
Su	M	Tu	W	Th	F	Sa
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

September						
Su	M	Tu	W	Th	F	Sa
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

October						
Su	M	Tu	W	Th	F	Sa
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

November						
Su	M	Tu	W	Th	F	Sa
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

December						
Su	M	Tu	W	Th	F	Sa
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

# CO MONITORING SITES



## Reporting Organizations

-  VA Department of Environmental Quality
-  Fairfax County Health Department

**CARBON MONOXIDE** (CO) is produced by incomplete combustion of carbon compounds, principally in internal combustion engines. Concentrations in the vicinity of heavily traveled highways are higher than ambient concentrations more than 100 meters from any highway. Carbon monoxide is not an irritant, and has little or no effect on plants or materials; however, it reacts in the bloodstream to deprive the heart and brain of oxygen. Moderate concentrations significantly reduce brain function and high concentrations can be lethal.

Carbon monoxide is measured continuously by infrared absorption photometry. Air is drawn continuously through a sample cell where infrared light passes through it. CO molecules in the air absorb part of the infrared light, reducing the intensity of the light reaching a light sensor. This portion of the infrared light absorbed by CO is converted into an electrical signal reflecting the CO concentration, and recorded.

**VIRGINIA 2003**  
**CARBON MONOXIDE SUMMARY BY REGIONS**  
**METHOD 51, 67 AND 93 - NONDISPERSIVE INFRARED**  
**Parts Per Million (ppm)**

LOCATION/ STATION NO.	NO. 1-HR OBS.	ONE HOUR AVERAGES					EIGHT HOUR AVERAGES*					
		MAX	DATE TIME	2ND MAX	DATE TIME	>35	MAX	DATE TIME	2ND MAX	DATE TIME	>9	
<b>WEST CENTRAL REGION</b>												
ROANOKE Carver Road	109-J**	4007	3.9	FEB 19 8:00 PM	3.7	FEB 19 7:00 PM	0	2.8	FEB 20 MIDNIGHT	2.4	JAN 26 1:00 AM	0
<b>PIEDMONT REGION</b>												
RICHMOND Forest Hill Fire Station	158-U	8692	4.6	FEB 3 6:00 AM	3.2	FEB 3 7:00 AM	0	2.4	DEC 9 1:00 AM	2.1	NOV 27 MIDNIGHT	0
RICHMOND Science Museum of VA	158-W	8631	3.2	FEB 2 11:00 PM	3.2	DEC 31 8:00 AM	0	2.1	NOV 2 1:00 AM	2.0	FEB 3 1:00 AM	0
<b>TIDEWATER REGION</b>												
HAMPTON Va. School for the Deaf & Blind	179-C	8559	2.8	DEC 16 6:00 AM	2.7	NOV 11 7:00 AM	0	2.4	DEC 9 5:00 AM	1.9	FEB 3 2:00 AM	0
NORFOLK Post Office Garage	181-V	8490	5.0	FEB 2 11:00 PM	4.6	FEB 2 8:00 PM	0	3.8	FEB 3 2:00 AM	2.9	DEC 9 1:00 AM	0
NORFOLK Norfolk State University	181-Z	8589	3.5	OCT 7 7:00 AM	3.4	JAN 24 9:00 PM	0	2.6	JAN 25 2:00 AM	2.6	FEB 3 1:00 AM	0
<b>NORTHERN REGION</b>												
ARLINGTON CO. Aurora Hills Visitors Center	47-T	7899	4.1	MAY 5 3:00 PM	4.1	MAY 17 8:00 PM	0	3.1	MAY 17 10:00 PM	2.5	MAY 17 7:00 PM	0

\*Eight Hour Averages stated as Ending Hour  
\*\* Site Terminated in June 2003

**VIRGINIA 2003  
CARBON MONOXIDE SUMMARY BY REGION  
METHOD 51 AND 54 - NONDISPERSIVE INFRA-RED  
Parts Per Million (ppm)**

LOCATION/ STATION NO.	NO. 1-HR OBS.	ONE HOUR AVERAGES					EIGHT HOUR AVERAGES*					
		MAX	DATE TIME	2ND MAX	DATE TIME	>35	MAX	DATE TIME	2ND MAX	DATE TIME	>9	
<b>NORTHERN REGION</b>												
FRANCONIA Lee District Park	46-B9	8698	2.6	NOV 22 2:00 AM	2.4	NOV 22 1:00 AM	0	1.7	NOV 22 7:00 AM	1.5	FEB 20 3:00 AM	0
<b>ALEXANDRIA</b>												
ALEXANDRIA 517 N. St. Asaph Street	L-126-C	8516	3.6	NOV 21 7:00 PM	3.5	JAN 9 9:00 PM	0	3.0	NOV 22 MIDNIGHT	2.8	JAN 10 MIDNIGHT	0
<b>FAIRFAX COUNTY</b>												
FAIRFAX CO. McLean Governmental Center	L-46-A8	8074	3.6	FEB 20 9:00 PM	3.3	NOV 21 9:00 PM	0	2.8	FEB 21 1:00 AM	2.7	NOV 22 MIDNIGHT	0
FAIRFAX CO. Mason Governmental Center	L-46-C1	8679	2.4	SEP 20 7:00 AM	2.2	SEP 20 6:00 AM	0	1.8	SEP 20 7:00 AM	1.6	MAR 13 6:00 AM	0
FAIRFAX CO. Upper Cub Run Treatment Plt.	L-46-F	5550	1.9	NOV 22 MIDNIGHT	1.9	NOV 22 1:00 AM	0	1.7	NOV 22 3:00 AM	1.4	DEC 10 MIDNIGHT	0

\*Eight Hour Averages stated as Ending Hour

**VIRGINIA 2003**  
**CARBON MONOXIDE CONCENTRATIONS IN RANGES**  
**METHOD 51, 67 AND 93 - NONDISPERSIVE INFRA-RED**  
**Parts Per Million (ppm)**

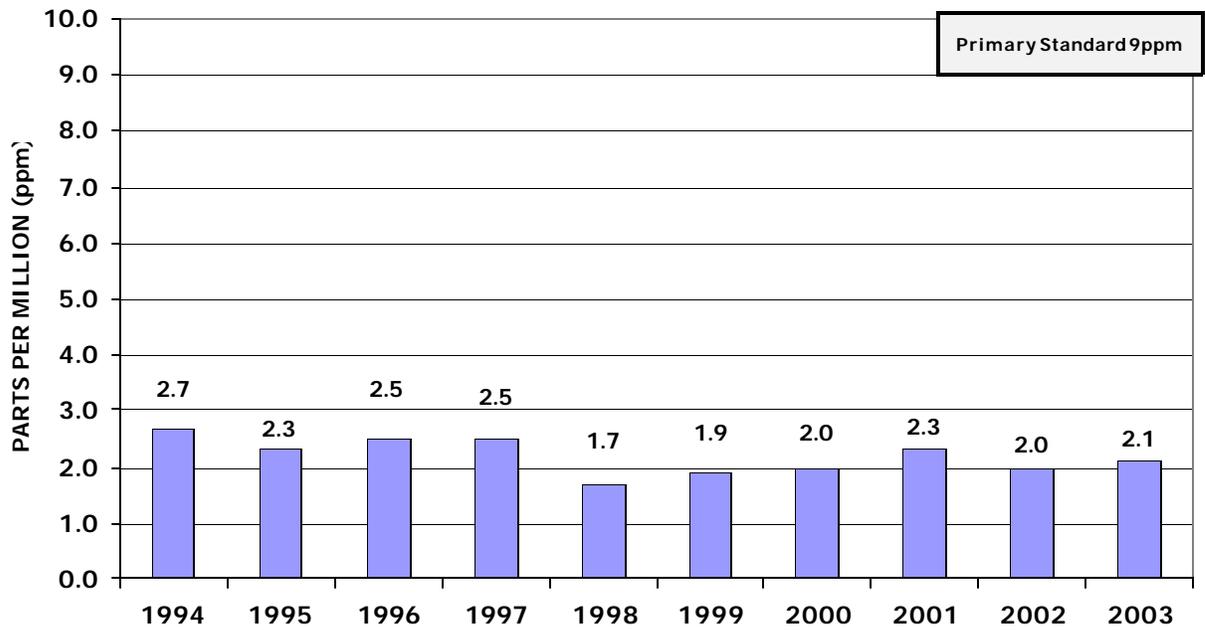
LOCATION/ STATION NO.	NO. 8-HR. OBS.	NUMBER OF 8-HOUR CONCENTRATIONS IN RANGES								
		0 to 4	5 to 8	9 to 12	13 to 16	17 to 20	21 to 24	25 to 28	>28	
<b>WEST CENTRAL REGION</b>										
ROANOKE Carver Road	109-J*	4053	4053	0	0	0	0	0	0	0
<b>PIEDMONT REGION</b>										
RICHMOND Forest Hill Fire Station	158-U	8755	8755	0	0	0	0	0	0	0
RICHMOND Science Museum of VA	158-W	8719	8719	0	0	0	0	0	0	0
<b>TIDEWATER REGION</b>										
HAMPTON Va. School for the Deaf & Blind	179-C	8657	8657	0	0	0	0	0	0	0
NORFOLK Post Office Garage	181-V	8585	8585	0	0	0	0	0	0	0
NORFOLK Norfolk State University	181-Z	8689	8689	0	0	0	0	0	0	0
<b>NORTHERN REGION</b>										
ARLINGTON CO. Aurora Hills Visitors Center	47-T	7982	7982	0	0	0	0	0	0	0

\* Site terminated June 2003

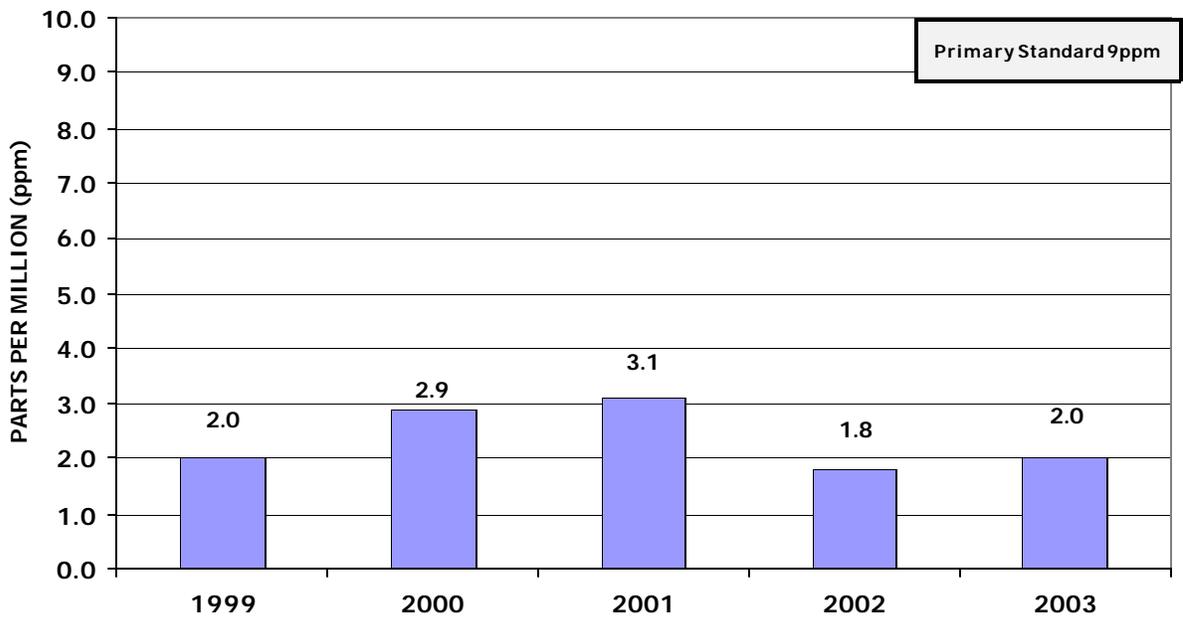
**VIRGINIA 2003**  
**CARBON MONOXIDE CONCENTRATIONS IN RANGES**  
**METHODS 51 AND 54 - NONDISPERSIVE INFRA-RED**  
**Parts Per Million (ppm)**

REGION/LOCATION STATION NO.	NO. 8-HR. OBS.	NUMBER OF 8-HOUR CONCENTRATIONS IN RANGES								
		0 to 4	5 to 8	9 to 12	13 to 16	17 to 20	21 to 24	25 to 28	>28	
<b>NORTHERN REGION</b>										
FRANCONIA Lee District Park	46-B9 8749	8749	0	0	0	0	0	0	0	0
<b>ALEXANDRIA</b>										
ALEXANDRIA 517 N. St. Asaph St.	L-126-C 8562	8562	0	0	0	0	0	0	0	0
<b>FAIRFAX COUNTY</b>										
FAIRFAX CO. 1437 Balls Hill Road	L-46-A8 8098	8098	0	0	0	0	0	0	0	0
FAIRFAX CO. Mason Governmental Center	L-46-C1 8710	8710	0	0	0	0	0	0	0	0
FAIRFAX CO. Upper Cub Run Treatment Plt.	L-46-F 5581	5581	0	0	0	0	0	0	0	0

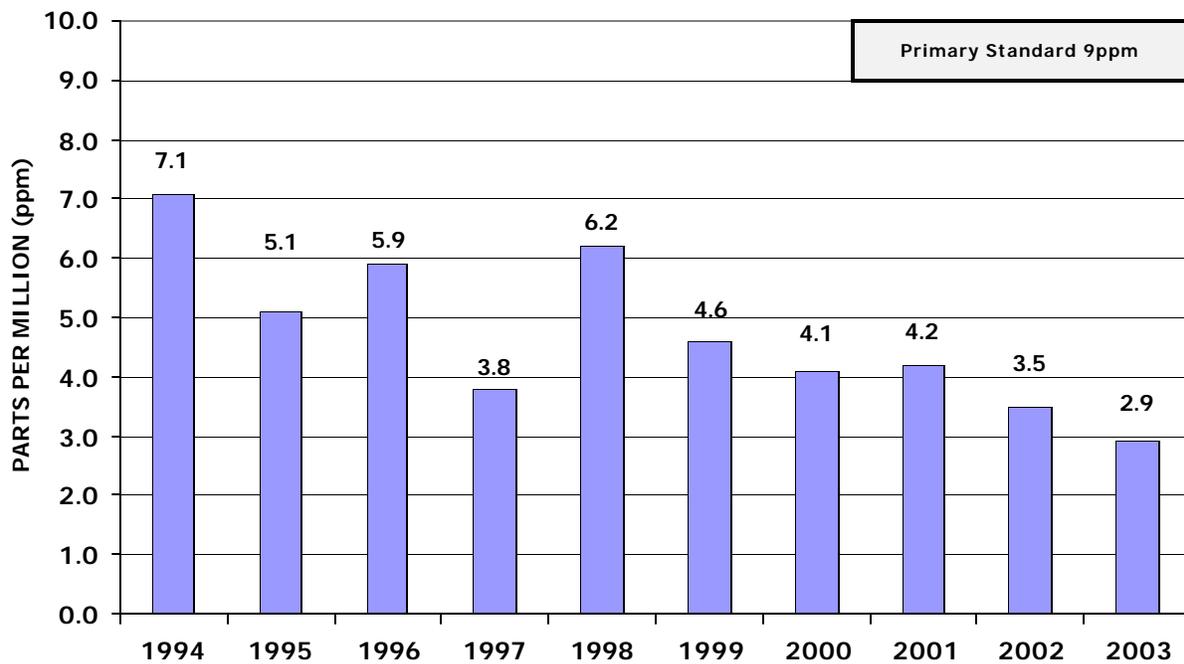
**CARBON MONOXIDE, PIEDMONT REGION  
EIGHT HOUR 2ND MAXIMUM  
158-U, Forest Hill Fire Station, Richmond**



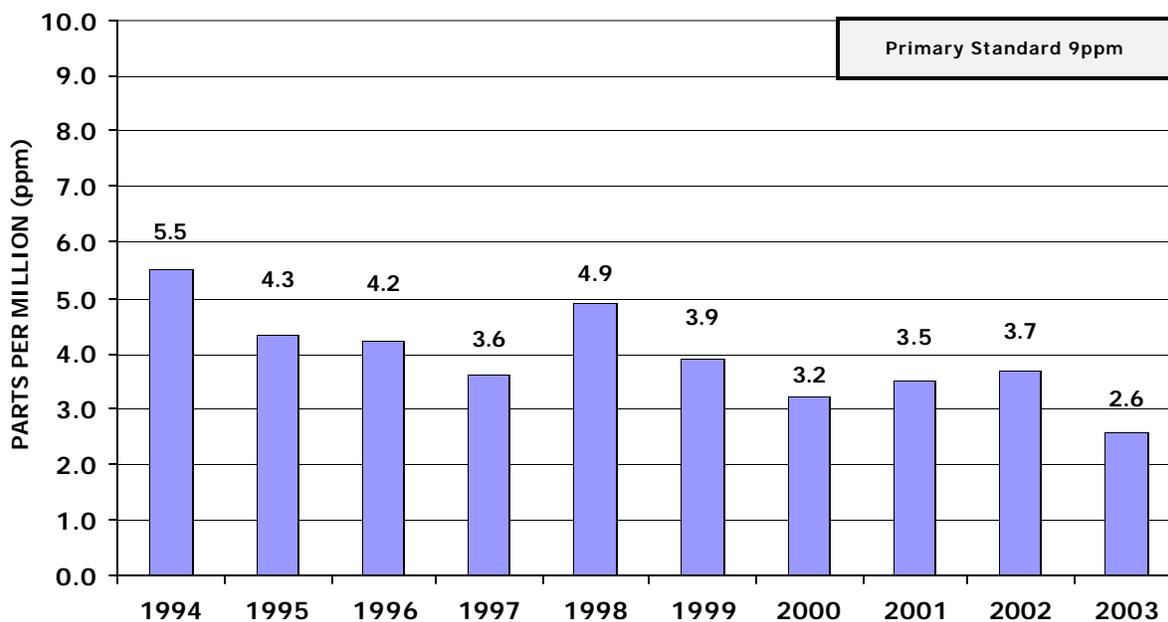
**CARBON MONOXIDE, PIEDMONT REGION  
EIGHT HOUR 2ND MAXIMUM  
158-W, Science Museum of Virginia, Richmond**



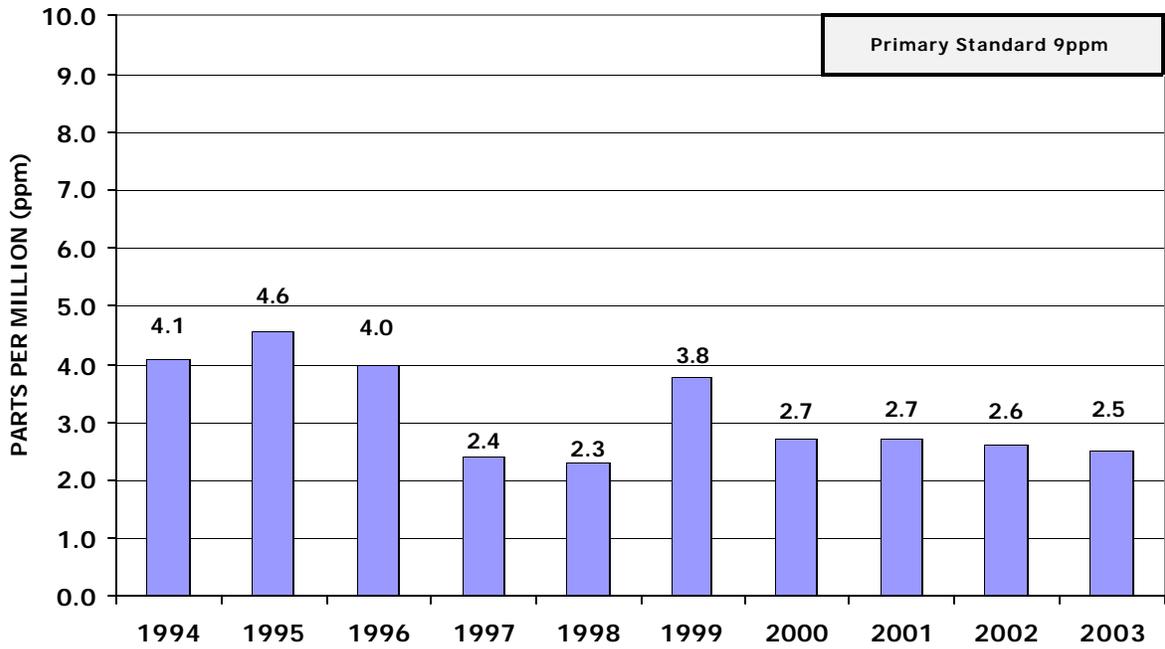
**CARBON MONOXIDE, TIDEWATER REGION  
EIGHT HOUR 2ND MAXIMUM  
181-V, Post Office, Norfolk**



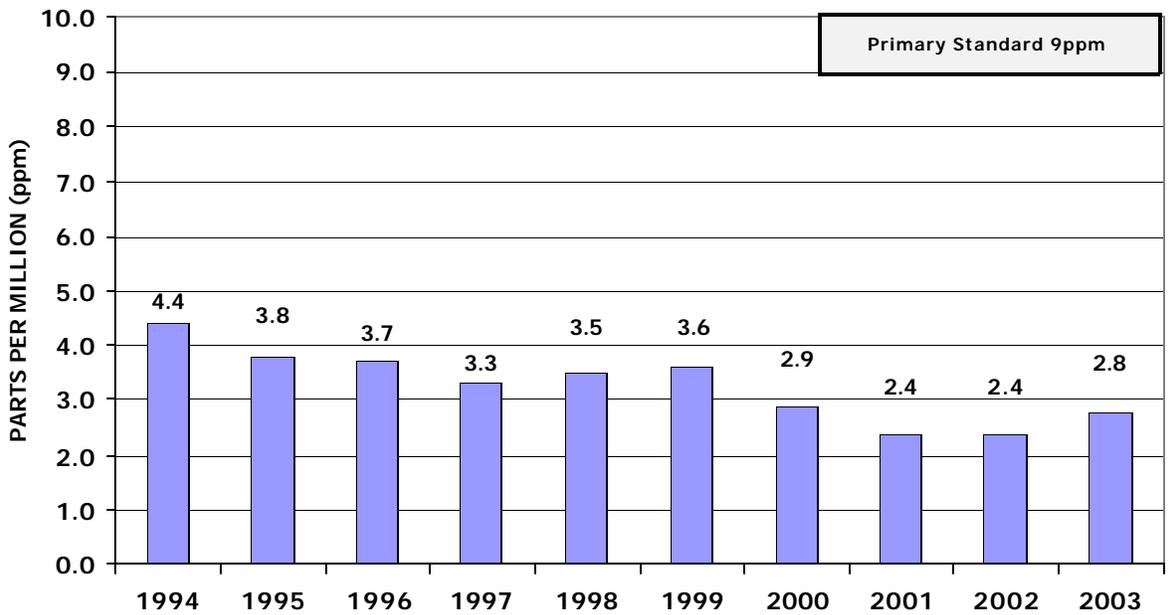
**CARBON MONOXIDE, TIDEWATER REGION  
EIGHT HOUR 2ND MAXIMUM  
181-Z, Norfolk State University, Norfolk**



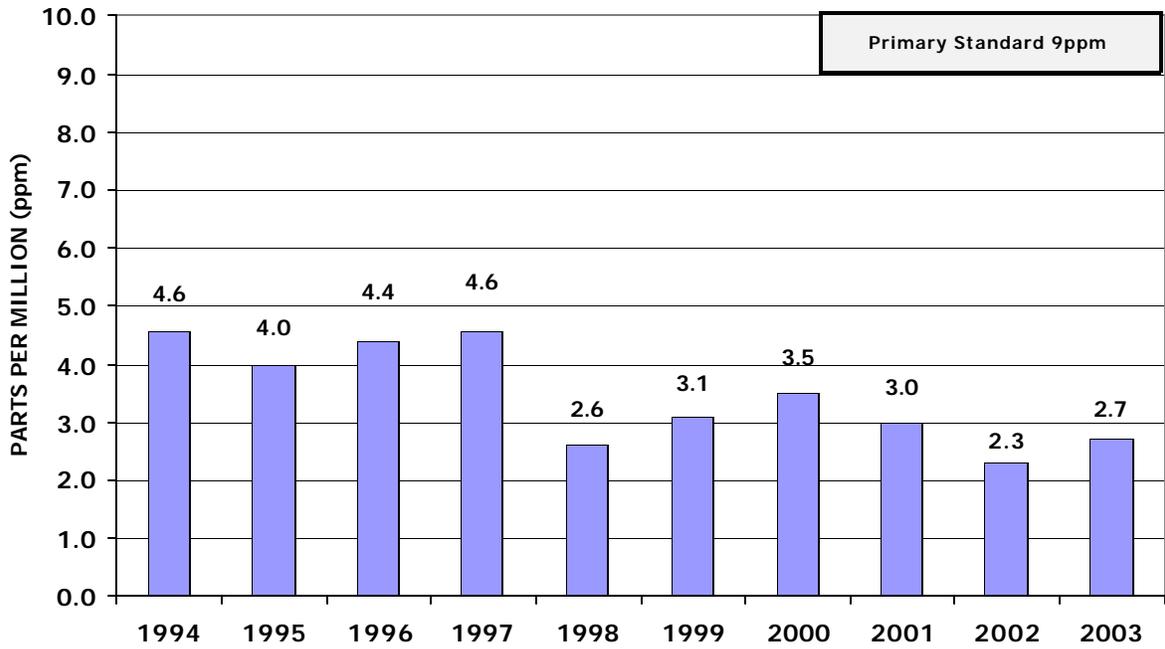
**CARBON MONOXIDE, NORTHERN REGION**  
**EIGHT HOUR 2ND MAXIMUM**  
**47-T, Aurora Hills Visitor Center, Arlington County**



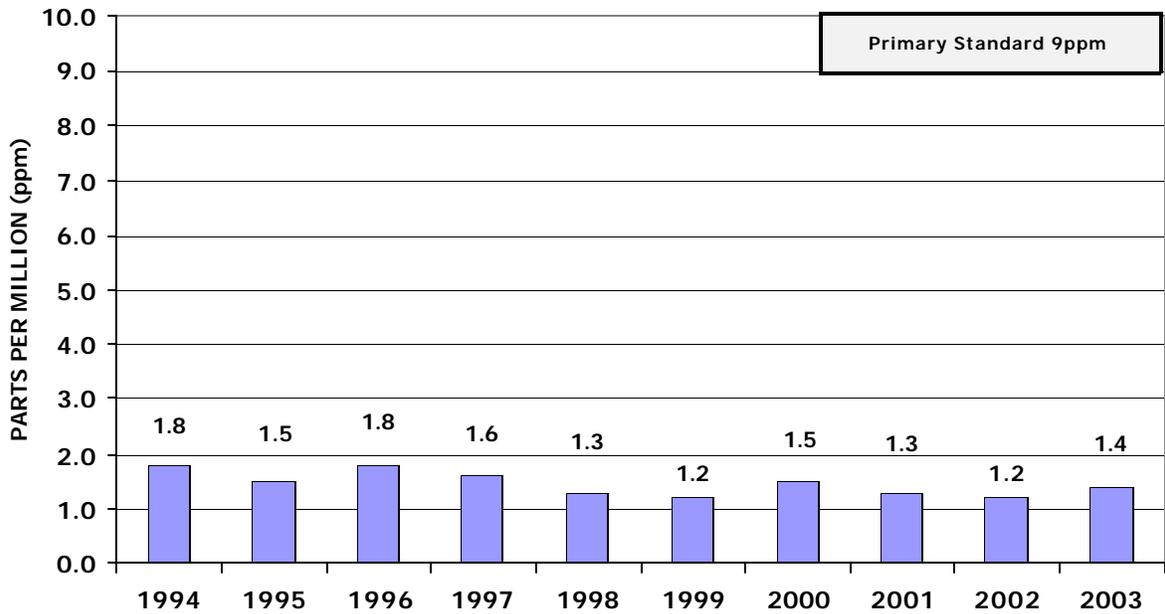
**CARBON MONOXIDE, ALEXANDRIA**  
**EIGHT HOUR 2ND MAXIMUM**  
**L-126-C, 517 North Saint Asaph Street**



**CARBON MONOXIDE, FAIRFAX COUNTY**  
**EIGHT HOUR 2ND MAXIMUM**  
**L-46-A8, McLean**



**CARBON MONOXIDE, FAIRFAX COUNTY**  
**EIGHT HOUR 2ND MAXIMUM**  
**L-46-F, Chantilly**



# SO<sub>2</sub> MONITORING SITES



## Reporting Organizations

-  VA Department of Environmental Quality
-  Fairfax County Health Department

**SULFUR DIOXIDE** (SO<sub>2</sub>) results from combustion processes (mainly burning of fossil fuels containing sulfur compounds), refining of petroleum, manufacture of sulfuric acid, and smelting of ore containing sulfur. Once in the atmosphere, some sulfur dioxide can be oxidized (either photochemically or in the presence of a catalyst) to SO<sub>3</sub> (sulfur trioxide). With water vapor, SO<sub>3</sub> is converted to sulfuric acid mist. Other basic oxides combine with SO<sub>3</sub> to form sulfate aerosols. These compounds can be transported long distances and fall back to earth as acid rain. SO<sub>2</sub> causes chlorosis in plant leaves and in moist air forms acids that damage structural materials. Their irritating effects in the respiratory tract are magnified by high particulate levels.

Sulfur dioxide is measured continuously with a fluorescence analyzer. Air is drawn through a sample cell where it is subjected to high intensity ultraviolet light. Sulfur dioxide molecules in the air are excited and fluoresce, releasing light characteristic of SO<sub>2</sub>. The fluorescence is detected with a photomultiplier tube and converted to an electrical signal related to the SO<sub>2</sub> concentration.

**VIRGINIA 2003**  
**SULFUR DIOXIDE SUMMARY BY REGIONS**  
**METHOD 61 AND 60 - ULTRAVIOLET FLUORESCENCE**  
**Parts Per Million (ppm)**

LOCATION/ STATION NO.	NO. 24-HR OBS.	FIXED MIDNIGHT TO MIDNIGHT 24-HOUR AVERAGES					ANNUAL ARITHMETIC MEAN	
		24-HR. MAX	DATE	24-HR. 2ND MAX	DATE	>.14		
<b>VALLEY REGION</b>								
ROCKINGHAM CO. Valley DEQ Office	26-E	363	.011	JAN 30	.010	JAN 27	0	.003
<b>WEST CENTRAL REGION</b>								
VINTON East Vinton Elementary School	19-A6	365	.013	JAN 30	.009	JAN 14	0	.003
<b>PIEDMONT REGION</b>								
CHARLES CITY CO. Route 608	75-B	354	.023	DEC 26	.018	FEB 4	0	.005
RICHMOND Science Museum	158-W	359	.027	JAN 16	.021	DEC 28	0	.004
<b>TIDEWATER REGION</b>								
HAMPTON Virginia School	179-C	359	.014	JAN 18	.014	DEC 8	0	.003
NORFOLK Norfolk State University	181-Z	363	.018	MAR 12	.017	JUL 22	0	.004
<b>ALEXANDRIA</b>								
ALEXANDRIA 517 North St. Asaph Street	L-126-C	355	.024	JAN 30	.023	JAN 18	0	.006

**VIRGINIA 2003**  
**SULFUR DIOXIDE SUMMARY BY REGIONS**  
**METHOD 009 - PULSED FLUORESCENT**  
**Parts Per Million (ppm)**

LOCATION/ STATION NO.	NO. 24-HR OBS.	FIXED MIDNIGHT TO MIDNIGHT 24-HOUR AVERAGES					
		24-HR. MAX	DATE	24-HR. 2ND MAX	DATE	>.14	ANNUAL ARITHMETIC MEAN
<b>FAIRFAX CO.</b>							
FAIRFAX CO. L-46-A8 1437 Balls Hill Road	350	.023	JAN 30	.022	DEC 8	0	.005
FAIRFAX CO. L-46-C1 Mason Governmental Center	357	.020	JAN 30	.020	DEC 8	0	.006
FAIRFAX CO. L-46-F Upper Cub Run Sewage Treatment Plant	361	.014	JAN 30	.013	FEB 17	0	.003

**VIRGINIA 2003**  
**SULFUR DIOXIDE SUMMARY BY REGIONS**  
**METHOD 61 AND 60 - ULTRAVIOLET FLUORESCENCE**  
**Parts Per Million (ppm)**

LOCATION/ STATION NO.	NO. 1-HR OBS.	3-HOUR BLOCK AVERAGES					ANNUAL ARITHMETIC MEAN
		3-HR. MAX	DATE	3-HR. 2ND MAX	DATE	>.5	
<b>VALLEY REGION</b>							
ROCKINGHAM CO. Valley DEQ Office	26-E 8577	.020	JUN 25 11:00 AM	.017	JAN 22 11:00 PM	0	.003
<b>WEST CENTRAL REGION</b>							
VINTON East Vinton Elementary School	19-A6 8640	.016	JAN 30 2:00 PM	.015	FEB 7 5:00 PM	0	.003
<b>PIEDMONT REGION</b>							
CHARLES CITY CO. Route 608	75-B 8404	.110	DEC 26 11:00 AM	.065	DEC 29 8:00 PM	0	.005
RICHMOND Science Museum	158-W 8519	.078	NOV 23 2:00 PM	.074	JAN 16 2:00 PM	0	.004
<b>TIDEWATER REGION</b>							
HAMPTON Virginia School	179-C 8525	.040	JUN 3 2:00 AM	.037	FEB 3 8:00 PM	0	.003
NORFOLK Norfolk State University	181-Z 8577	.061	MAR 12 8:00 AM	.059	AUG 13 11:00 AM	0	.004
<b>ALEXANDRIA</b>							
ALEXANDRIA 517 North St. Asaph Street	L-126-C 8448	.113	NOV 2 5:00 PM	.071	NOV 1 11:00 AM	0	.006

**VIRGINIA 2003**  
**SULFUR DIOXIDE SUMMARY BY REGIONS**  
**METHOD 009 - PULSED FLUORESCENT**  
**Parts Per Million (ppm)**

LOCATION/ STATION NO.	NO. 1-HR OBS.	3-HOUR BLOCK AVERAGES						
		3-HR. MAX	DATE	3-HR. 2ND MAX	DATE	> .5	ANNUAL ARITHMETIC MEAN	
<b>FAIRFAX CO.</b>								
FAIRFAX CO. L-46-A8 1437 Balls Hill Road	8398	.039	DEC 4 5:00 PM	.038	DEC 8 5:00 PM	0	.005	
FAIRFAX CO. L-46-C1 Mason Governmental Center	8553	.036	DEC 8 8:00 PM	.033	NOV 22 11:00 AM	0	.006	
FAIRFAX CO. L-46-F Upper Cub Run Treatment Plant	8615	.028	JUN 30 8:00 PM	.025	AUG 12 8:00 PM	0	.003	

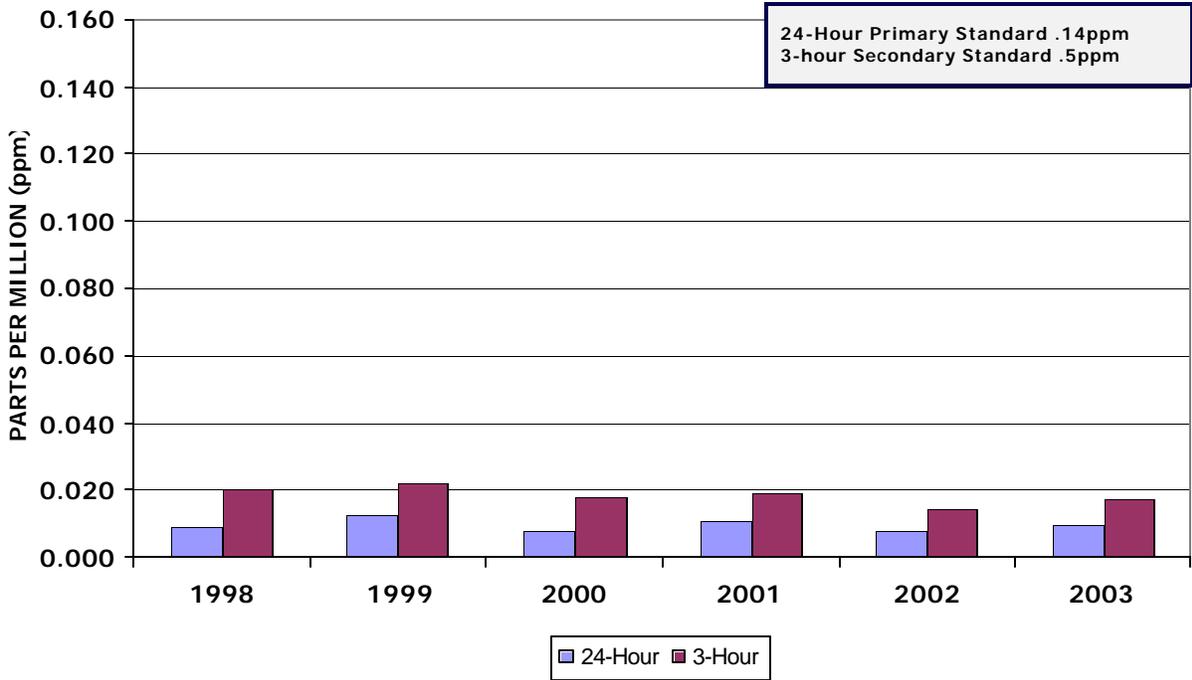
**VIRGINIA 2003**  
**SULFUR DIOXIDE CONCENTRATIONS IN RANGES**  
**METHODS 60 and 61 - ULTRAVIOLET FLUORESCENCE**  
**Parts Per Million (ppm)**

LOCATION/ STATION NO.	NO. 24-HR. OBS.	NUMBER OF 24-HOUR CONCENTRATIONS IN RANGES								
		.00 to .04	.05 to .08	.09 to .12	.13 to .16	.17 to .20	.21 to .24	.25 to .28	>.28	
<b>VALLEY REGION</b>										
ROCKINGHAM CO. 26-E Valley DEQ Office	363	363	0	0	0	0	0	0	0	0
<b>WEST CENTRAL REGION</b>										
VINTON 19-A6 East Vinton Elementary School	365	365	0	0	0	0	0	0	0	0
<b>PIEDMONT REGION</b>										
CHARLES CITY CO. 75-B Route 608	354	354	0	0	0	0	0	0	0	0
RICHMOND 158-W Science Museum	359	359	0	0	0	0	0	0	0	0
<b>TIDEWATER REGION</b>										
HAMPTON 179-C Virginia School	359	359	0	0	0	0	0	0	0	0
NORFOLK 181-Z Norfolk State University	363	363	0	0	0	0	0	0	0	0
<b>ALEXANDRIA</b>										
ALEXANDRIA L-126-C 517 North St. Asaph Street	355	355	0	0	0	0	0	0	0	0

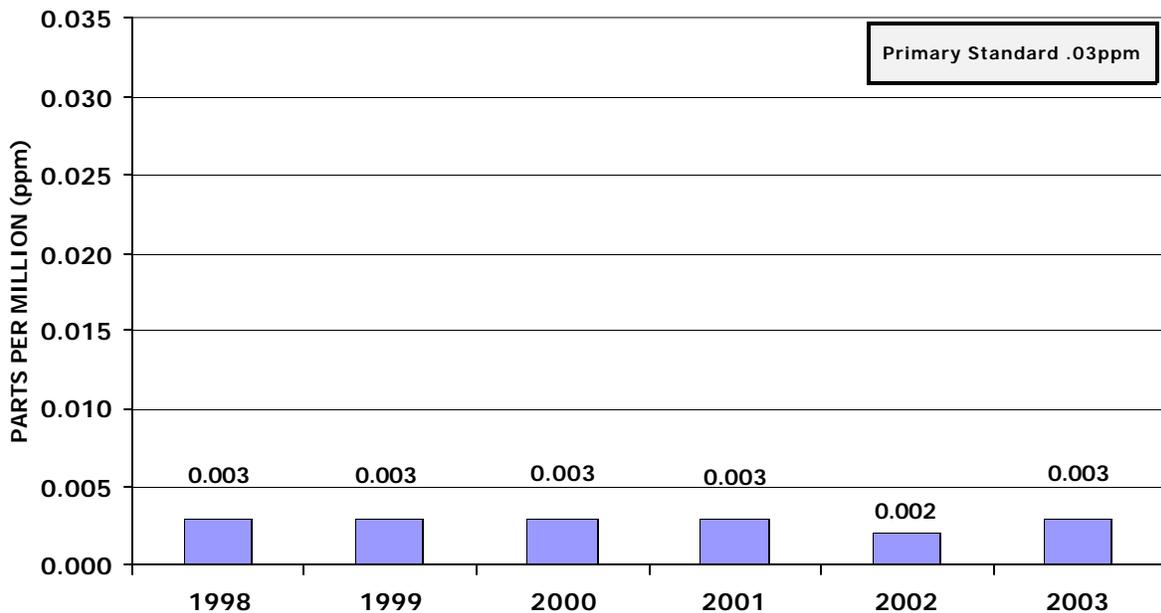
**VIRGINIA 2003**  
**SULFUR DIOXIDE CONCENTRATIONS IN RANGES**  
**METHODS 61 AND 009 - ULTRA VIOLET FLUORESCENCE**  
**Parts Per Million (ppm)**

LOCATION/ STATION NO.	NO. 24-HR. OBS.	NUMBER OF 24-HOUR CONCENTRATIONS IN RANGES								
		.00 to .04	.05 to .08	.09 to .12	.13 to .16	.17 to .20	.21 to .24	.25 to .28	>.28	
<b>FAIRFAX COUNTY</b>										
FAIRFAX CO. L-46-A8 1437 Balls Hill Road	350	350	0	0	0	0	0	0	0	0
FAIRFAX CO. L-46-C1 Mason Governmental Center	357	357	0	0	0	0	0	0	0	0
FAIRFAX CO. L-46-F Upper Cub Run Sewage Treatment Plant	361	361	0	0	0	0	0	0	0	0

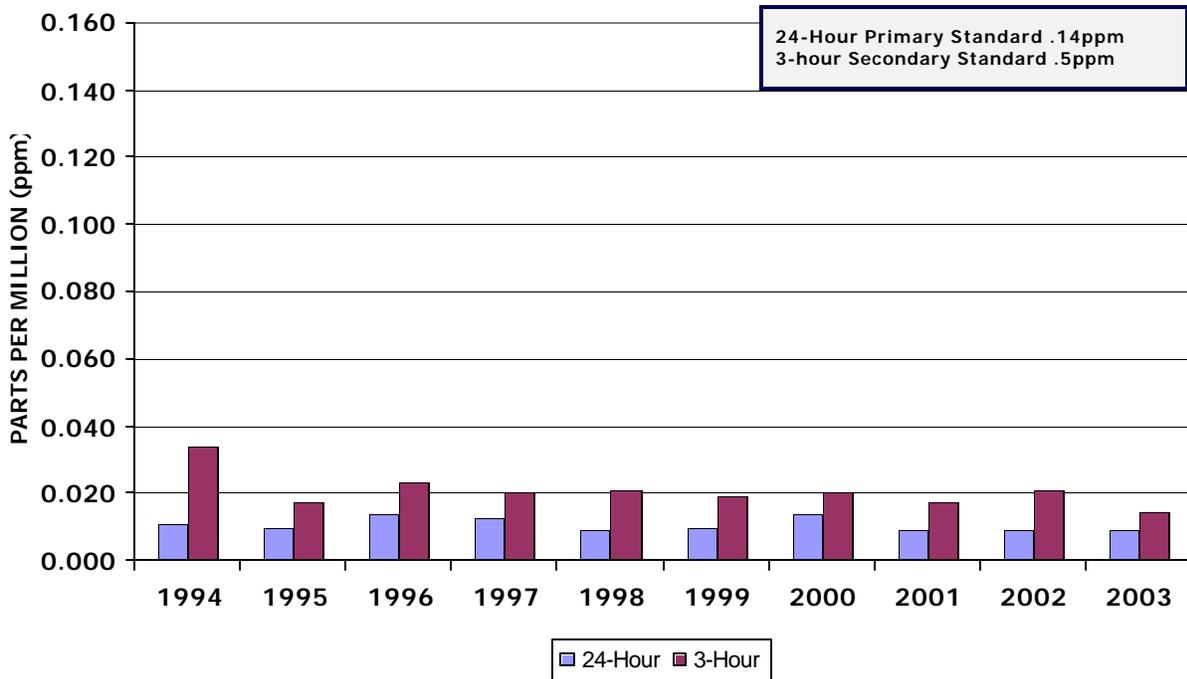
**SULFUR DIOXIDE, VALLEY REGION  
2ND MAXIMUM VALUE  
26-E, Rockingham County**



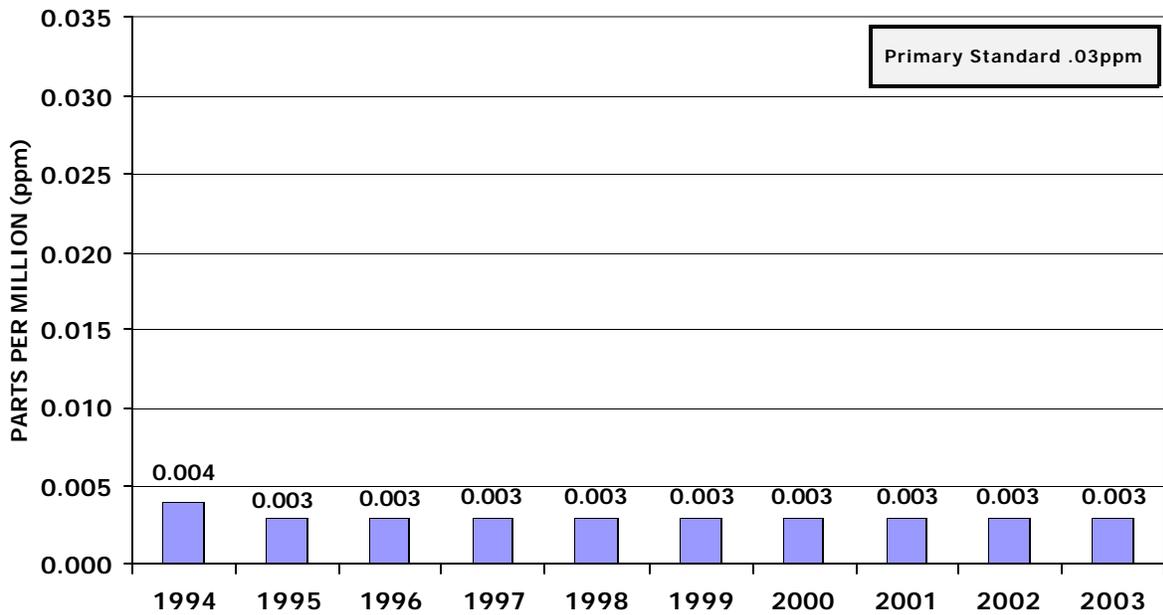
**SULFUR DIOXIDE, VALLEY REGION  
ANNUAL ARITHMETIC MEAN  
26-E, Rockingham County**



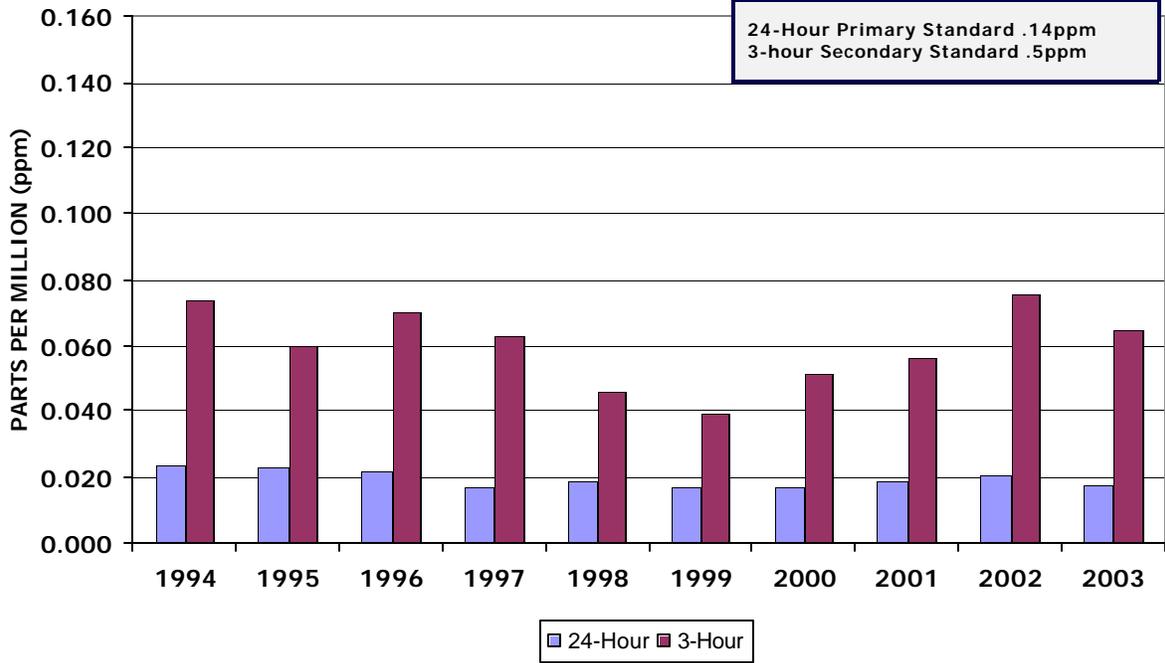
**SULFUR DIOXIDE, WEST CENTRAL REGION  
2ND MAXIMUM VALUE  
19-A6, Vinton Elementary School**



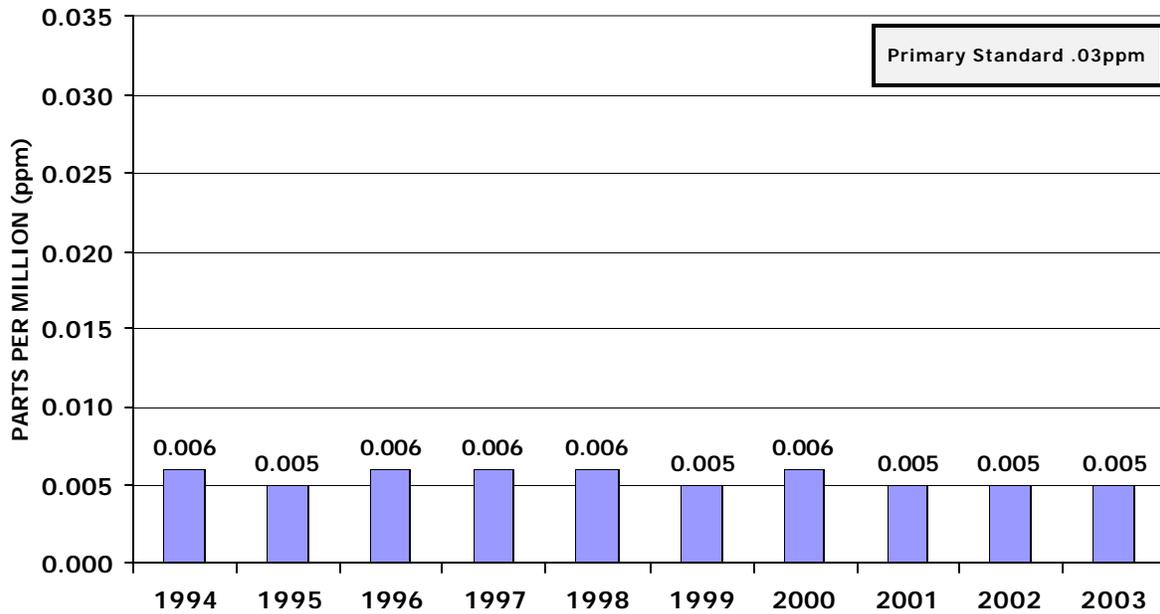
**SULFUR DIOXIDE, WEST CENTRAL REGION  
ANNUAL ARITHMETIC MEAN  
19-A6, Vinton Elementary School, Vinton**

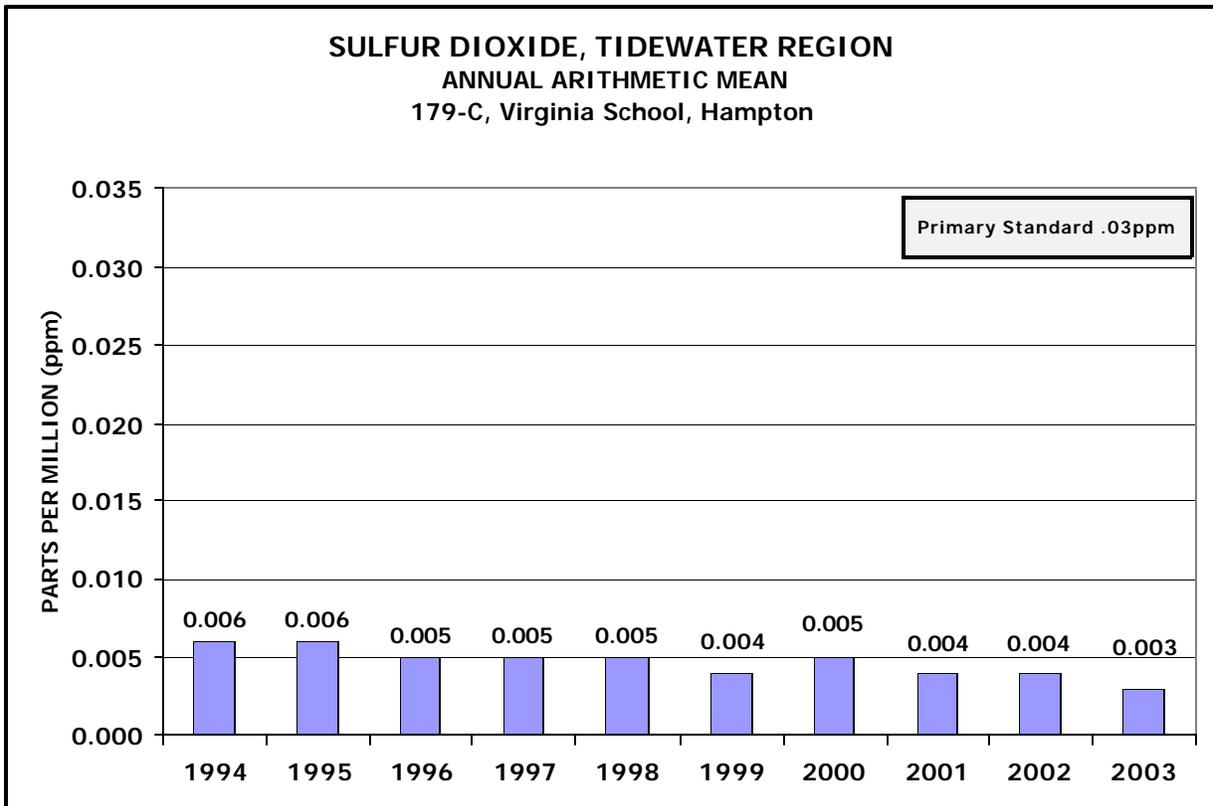
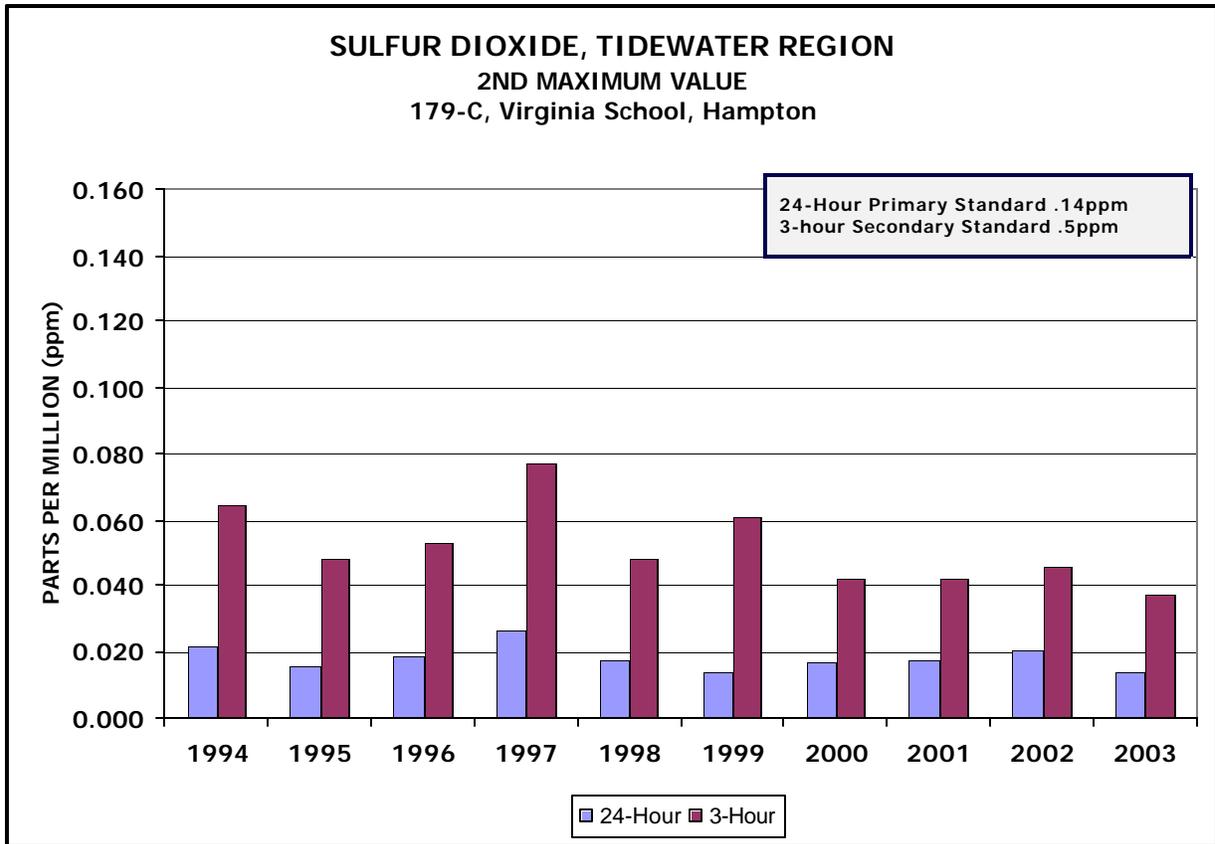


**SULFUR DIOXIDE, PIEDMONT REGION  
2ND MAXIMUM VALUE  
75-B, Charles City County**

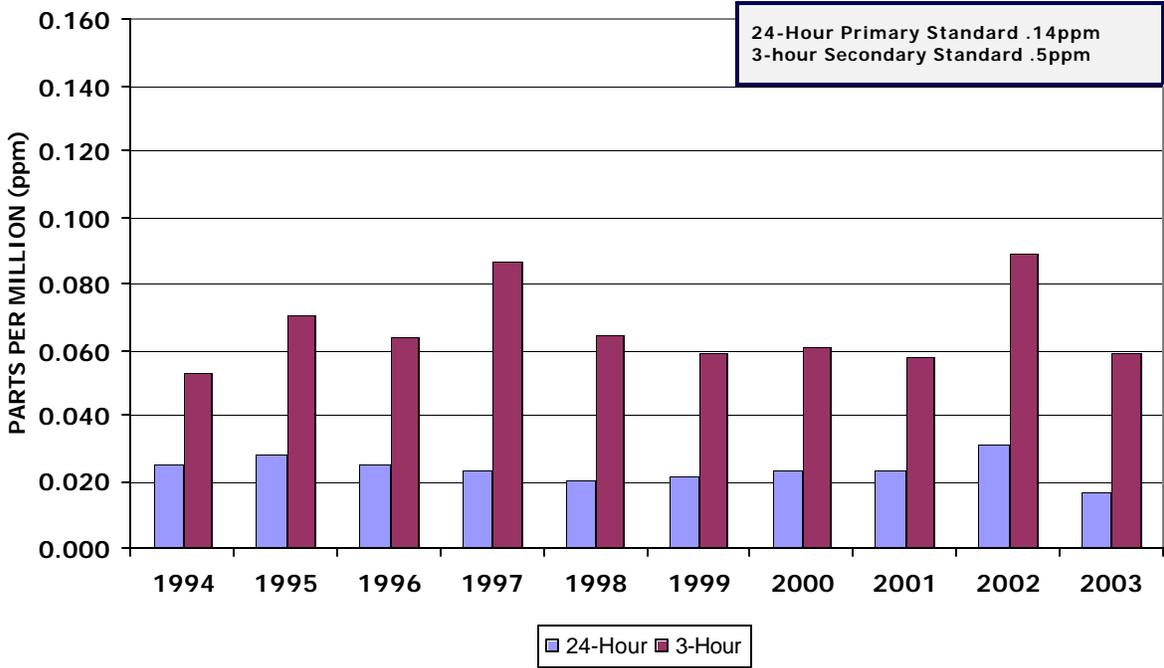


**SULFUR DIOXIDE, PIEDMONT REGION  
ANNUAL ARITHMETIC MEAN  
75-B, Charles City County**

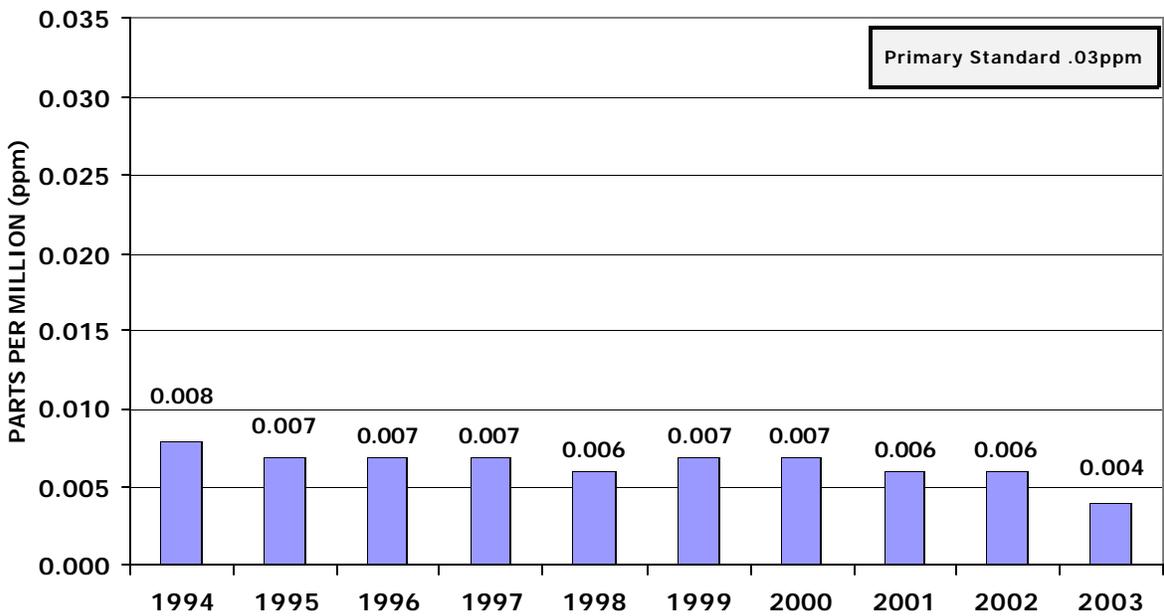




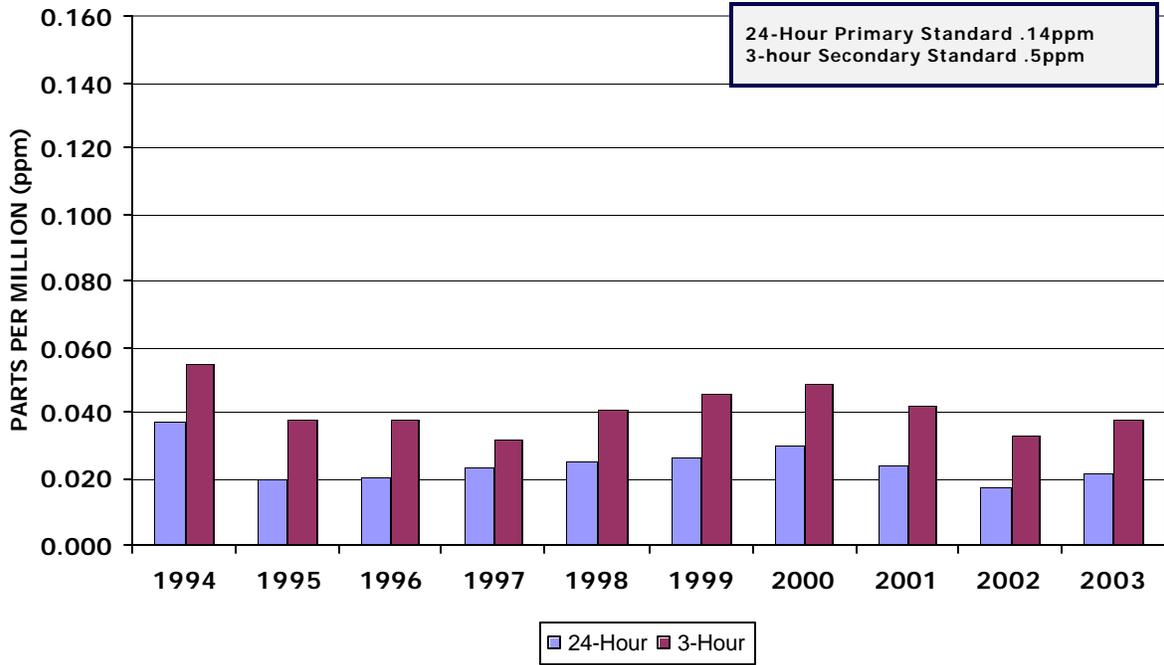
**SULFUR DIOXIDE, TIDEWATER REGION  
2ND MAXIMUM VALUE  
181-Z, Norfolk State University, Norfolk**



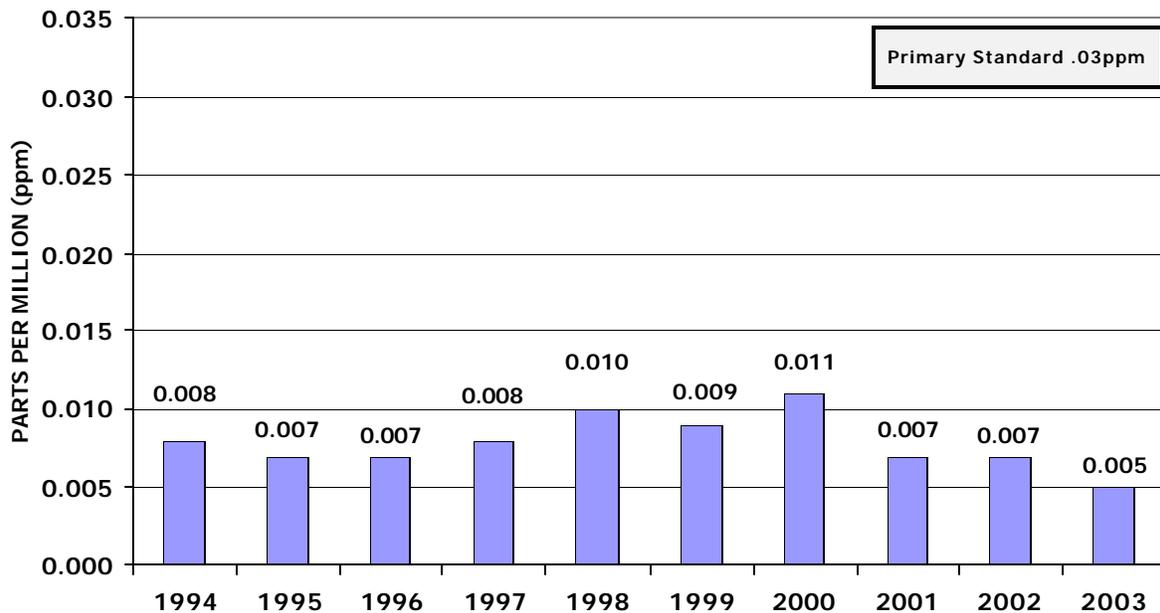
**SULFUR DIOXIDE, TIDEWATER REGION  
ANNUAL ARITHMETIC MEAN  
181-Z, Norfolk State University, Norfolk**

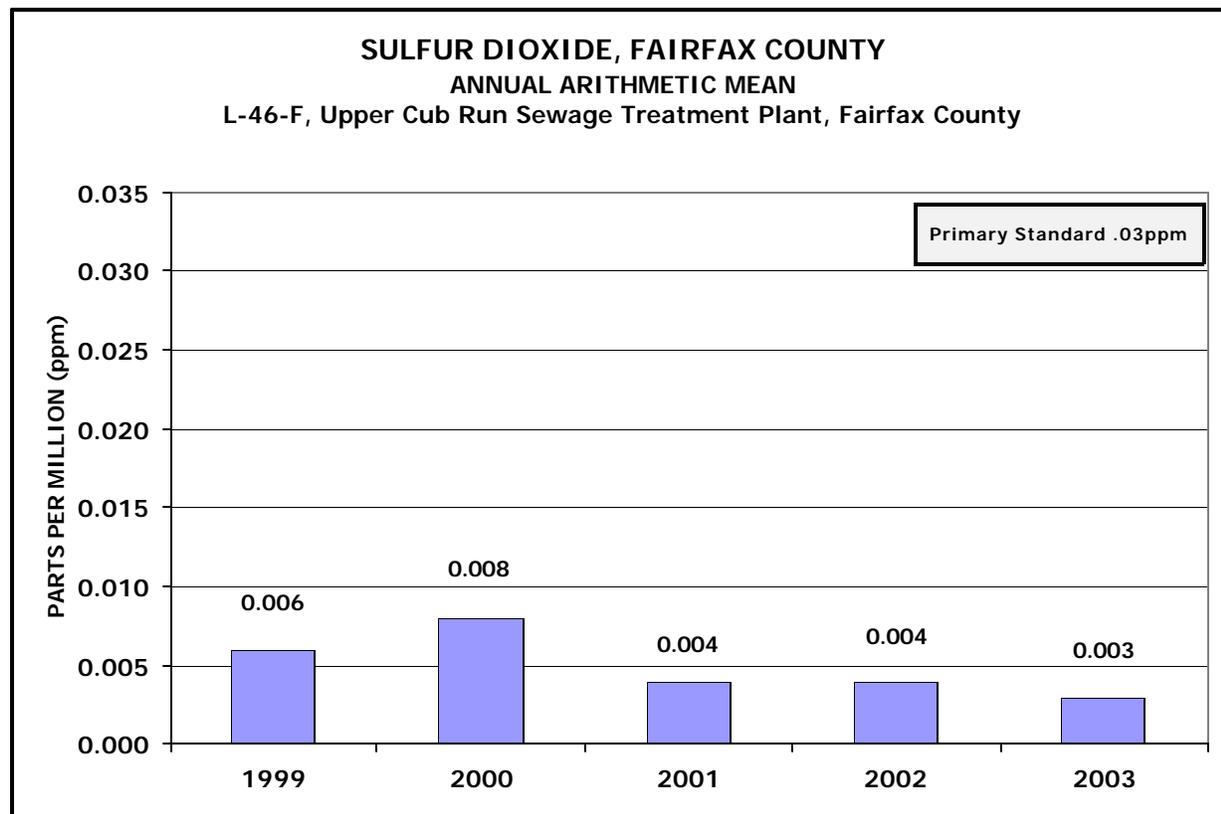
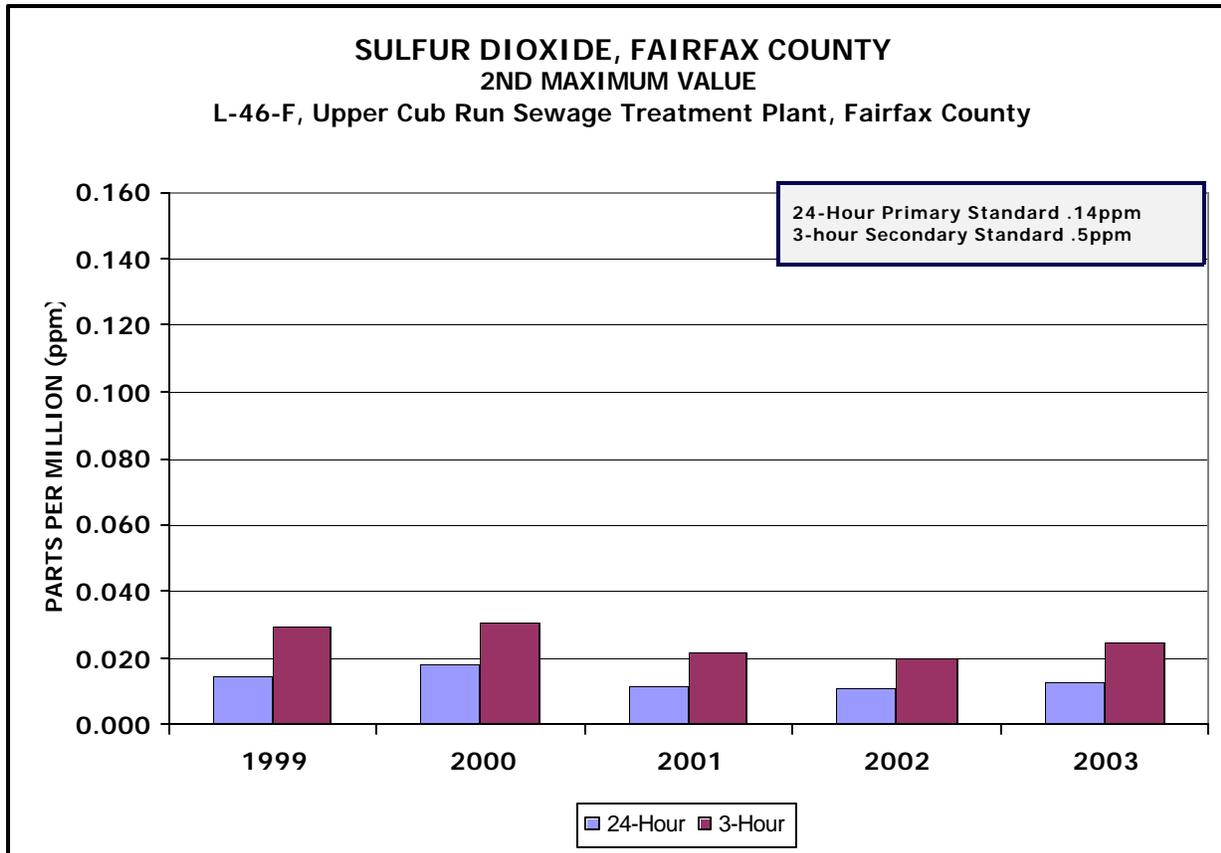


**SULFUR DIOXIDE, FAIRFAX COUNTY**  
**2ND MAXIMUM VALUE**  
 L-46-A8, McLean Governmental Center, Fairfax County

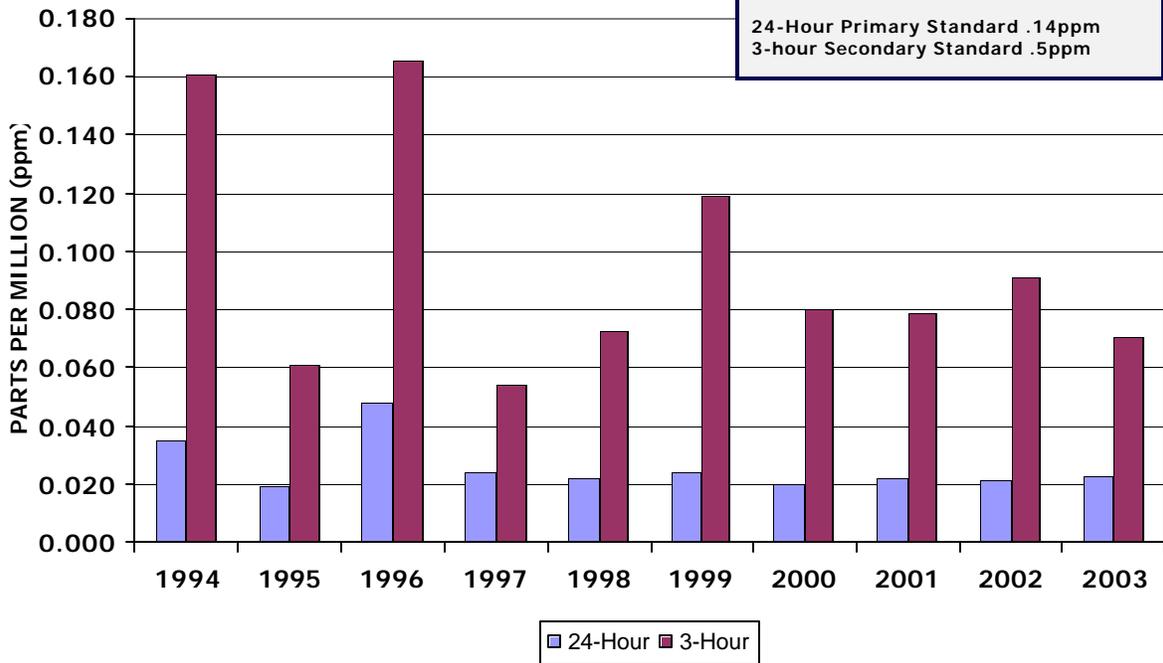


**SULFUR DIOXIDE, FAIRFAX COUNTY**  
**ANNUAL ARITHMETIC MEAN**  
 L-46-A8, McLean Governmental Center, Fairfax County

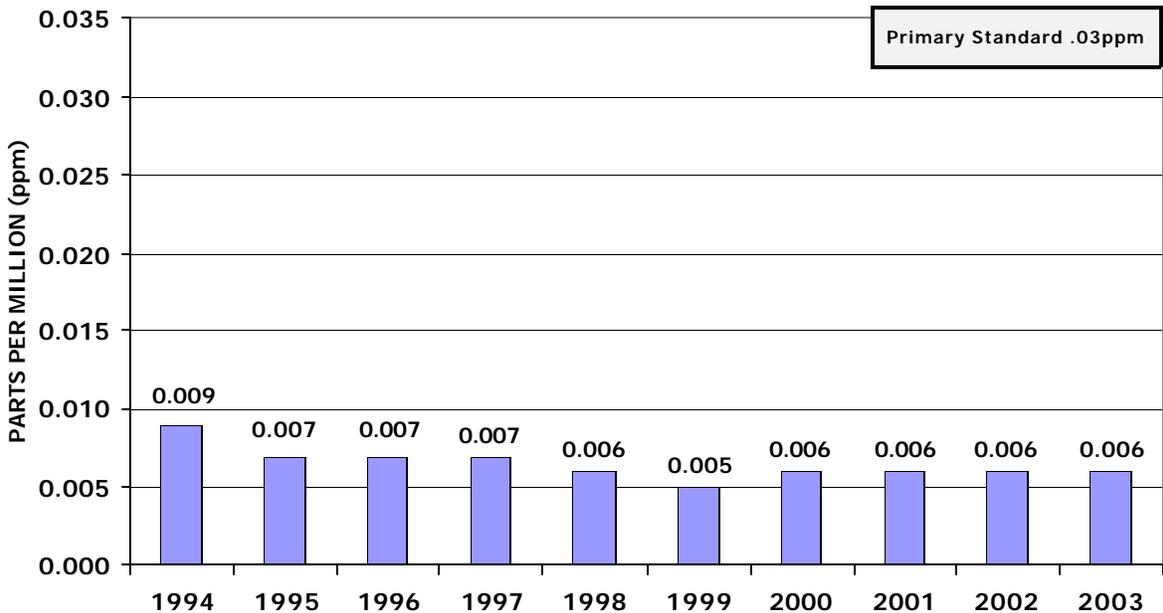




**SULFUR DIOXIDE, ALEXANDRIA**  
**2ND MAXIMUM VALUE**  
**L-126-C, 517 North Saint Asaph Street**



**SULFUR DIOXIDE, ALEXANDRIA**  
**ANNUAL ARITHMETIC MEAN**  
**L-126-C, 517 North Saint Asaph Street**



# NO<sub>2</sub> MONITORING SITES



## Reporting Organizations

-  VA Department of Environmental Quality
-  Fairfax County Health Department

**NITROGEN DIOXIDE** (NO<sub>2</sub>), a secondary derivative of atmospheric nitric oxide, is formed when combustion temperatures are extremely high, as in the burning of coal, oil, gas, and gasoline, and has been clearly established as exerting detrimental effect on human health and welfare. NO<sub>2</sub> in high concentrations can cause impairment of dark adaptation, increase airway resistance and respiratory rate, and enhance susceptibility to respiratory infections.

Nitrogen oxides (NO, NO<sub>2</sub>, NO<sub>x</sub>) are measured continuously using the chemiluminescent reaction of nitric oxide (NO) with ozone (O<sub>3</sub>). Air is drawn through the analyzer continuously, and mixed with a high concentration of ozone in a reaction chamber. Any NO in the air reacts with the ozone to produce NO<sub>2</sub> which releases light having a characteristic spectrum. The light resulting from the reaction is detected with a photomultiplier tube, and converted to an electrical signal reflecting the NO concentration. Total nitrogen oxides (NO<sub>x</sub>) are measured by passing the air through a converter where any NO<sub>2</sub> in the air is reduced to NO before passing the air on to the reaction chamber. By alternately passing the air directly to the reaction chamber, and through the converter before the reaction chamber, the analyzer alternately measures NO and NO<sub>x</sub>. The NO<sub>2</sub> concentration is the difference between NO and NO<sub>x</sub>.

**VIRGINIA 2003**  
**NITROGEN DIOXIDE SUMMARY BY REGION**  
**METHOD 25 AND 74 - CHEMILUMINESCENCE**  
**Parts Per Million (ppm)**

LOCATION/ STATION NO.	NO. 1-HOUR OBS.	HOURLY VALUES					
		1-HR. MAX	DATE TIME	1-HOUR 2ND MAX	DATE TIME	ANNUAL ARITHMETIC MEAN	ANNUAL MEAN >.05
<b>WEST CENTRAL REGION</b>							
VINTON East Vinton Elementary School	19-A6 8630	.053	APR 29 11:00 PM	.052	NOV 3 11:00 PM	.013	0
<b>PIEDMONT REGION</b>							
CHARLES CITY CO. Route 608	75-B 7115	.084	APR 15 8:00 PM	.083	MAR 26 MIDNIGHT	.011	0
RICHMOND Science Museum	158-W 8298	.108	DEC 31 8:00 AM	.089	DEC 31 7:00 AM	.016	0
<b>TIDEWATER REGION</b>							
NORFOLK Norfolk State University	181-Z 8454	.085	JUN 25 9:00 PM	.071	JUN 24 9:00 PM	.016	0
<b>NORTHERN REGION</b>							
ASHBURN Broad Run High School	38-I 8452	.061	NOV 3 6:00 PM	.058	FEB 27 10:00 PM	.016	0
ARLINGTON CO. Aurora Hills Visitors Center	47-T 8491	.080	FEB 21 9:00 AM	.079	APR 3 8:00 AM	.026	0
PRINCE WILLIAM CO. Long Park	45-L 8611	.053	APR 3 7:00 PM	.052	FEB 27 11:00 PM	.012	0

**VIRGINIA 2003  
NITROGEN DIOXIDE SUMMARY BY REGION  
METHOD 25 AND 74 - CHEMILUMINESCENCE  
Parts Per Million (ppm)**

LOCATION/ STATION NO.	NO. 1-HOUR OBS.	HOURLY VALUES					
		1-HR. MAX	DATE TIME	1-HOUR 2ND MAX	DATE TIME	ANNUAL ARITHMETIC MEAN	ANNUAL MEAN >.05
<b>ALEXANDRIA</b>							
ALEXANDRIA L-126-C 517 North St. Asaph Street	8263	.078	APR 16 7:00 PM	.073	FEB 19 11:00 AM	.023	0
<b>FAIRFAX CO.</b>							
FAIRFAX CO. L-46-A8 1437 Balls Hill Road	3155	.118	OCT 22 8:00 AM	.080	NOV 3 5:00 AM	.023*	0
FAIRFAX CO. L-46-C1 Mason Governmental Center	8649	.063	JUL 18 8:00 PM	.062	MAR 3 11:00 PM	.018	0
FAIRFAX CO. L-46-F Upper Cub Run Treatment Plant	8604	.048	FEB 21 9:00 AM	.048	FEB 28 MIDNIGHT	.010	0

\* Did not meet EPA's minimum data capture requirements.

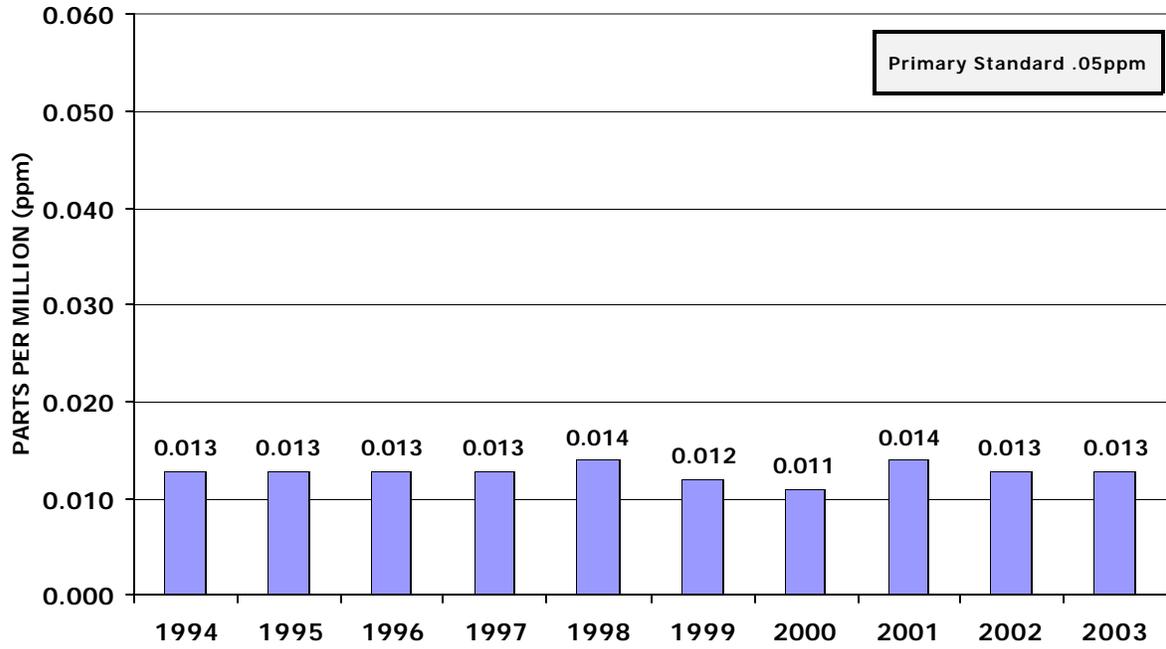
**VIRGINIA 2003**  
**NITROGEN DIOXIDE CONCENTRATIONS IN RANGES**  
**METHOD 25 AND 74 - CHEMILUMINESECE**  
**Parts Per Million (ppm)**

LOCATION/ STATION NO.	NO. 1-HR. OBS.	NUMBER OF 1-HOUR CONCENTRATIONS IN RANGES								
		.00 to .04	.05 to .08	.09 to .12	.13 to .16	.17 to .20	.21 to .24	.25 to .28	>.28	
<b>WEST CENTRAL REGION</b>										
VINTON East Vinton Elementary School	19-A6 8630	8610	20	0	0	0	0	0	0	0
<b>PIEDMONT REGION</b>										
CHARLES CITY CO. Route 608	75-B 7115	7056	59	0	0	0	0	0	0	0
RICHMOND Science Museum	158-W 8298	8076	220	2	0	0	0	0	0	0
<b>TIDEWATER REGION</b>										
NORFOLK Norfolk State University	181-Z 8454	8361	92	1	0	0	0	0	0	0
<b>NORTHERN REGION</b>										
ASHBURN Broad Run High School	38-I 8452	8328	124	0	0	0	0	0	0	0
ARLINGTON CO. Aurora Hills Visitors Center	47-T 8491	7791	700	0	0	0	0	0	0	0
PRINCE WILLIAM CO. Long Park	45-L 8611	8584	27	0	0	0	0	0	0	0

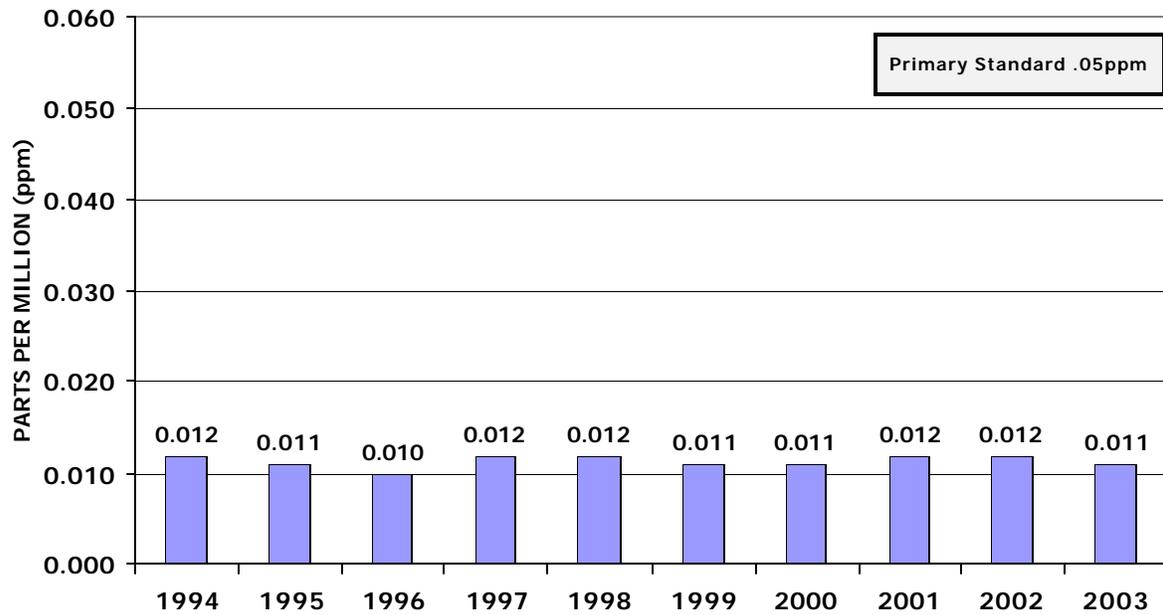
**VIRGINIA 2003  
 NITROGEN DIOXIDE CONCENTRATIONS IN RANGES  
 METHOD 25 AND 74 - CHEMILUMINESCENCE  
 Parts Per Million (ppm)**

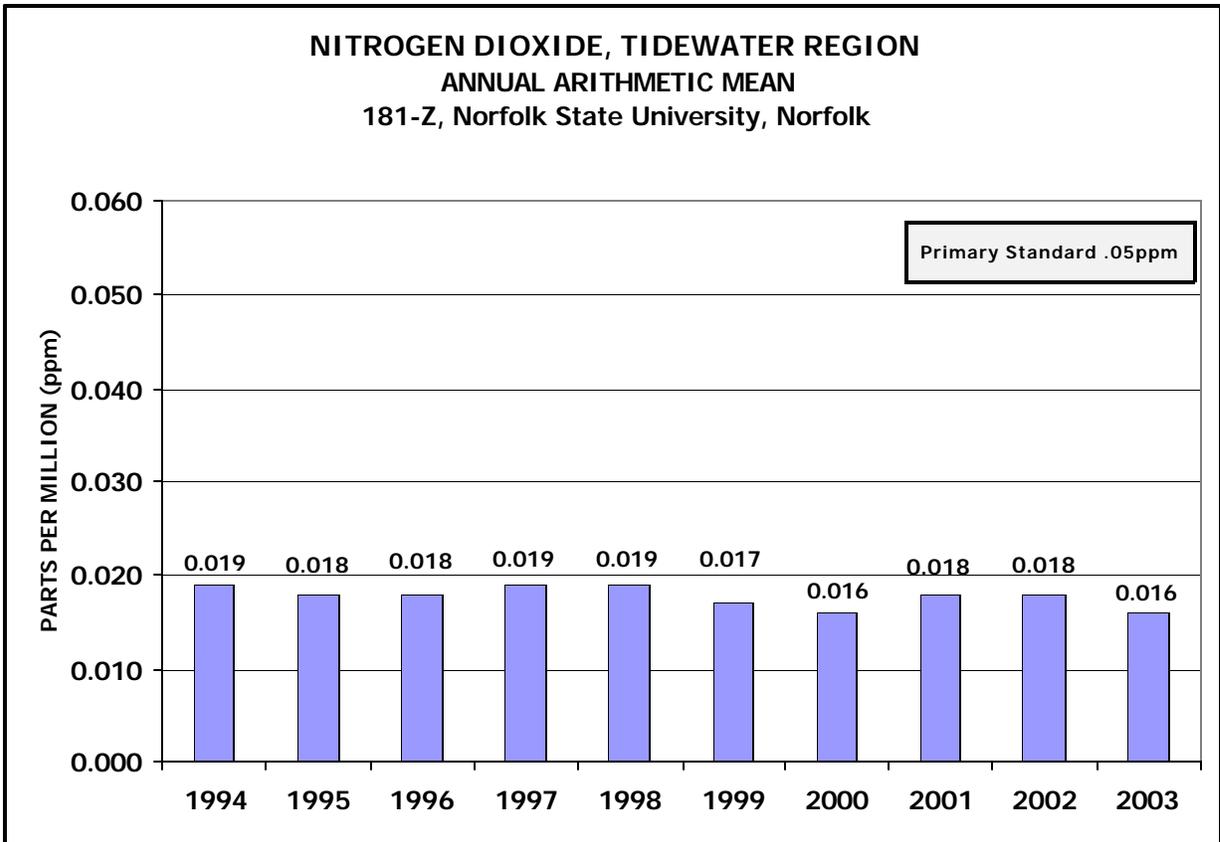
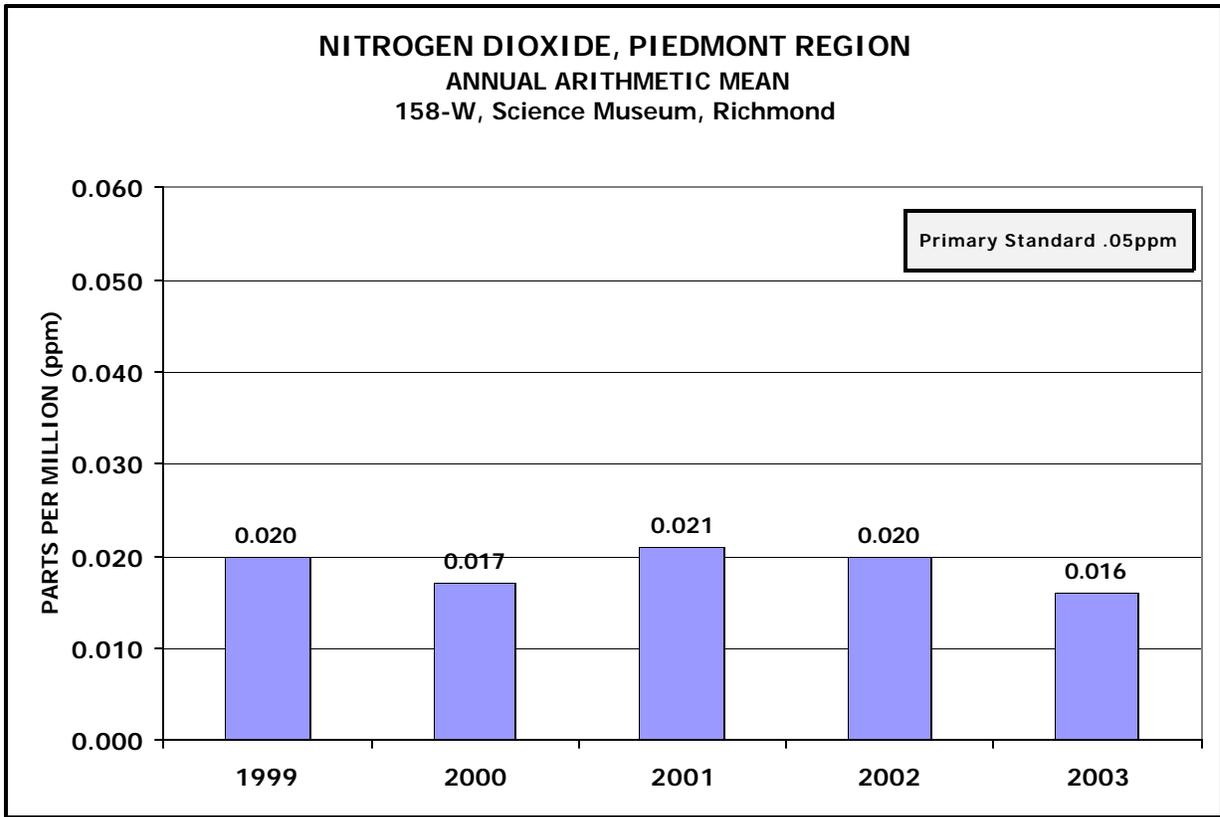
LOCATION/ STATION NO.	NO. 1-HR. OBS.	NUMBER OF 1-HOUR CONCENTRATIONS IN RANGES									
		.00 to .04	.05 to .08	.09 to .12	.13 to .16	.17 to .20	.21 to .24	.25 to .28	>.28		
		<b>ALEXANDRIA</b>									
ALEXANDRIA 517 North St. Asaph Street	L-126-C	8263	8010	253	0	0	0	0	0	0	0
<b>FAIRFAX COUNTY</b>											
FAIRFAX CO. 1437 Balls Hill Road	L-46-A8	3155	3073	81	1	0	0	0	0	0	0
FAIRFAX CO. 6507 Columbia Pike	L-46-C1	8649	8486	163	0	0	0	0	0	0	0
FAIRFAX CO. Upper Cub Run Sewage Treatment Plant	L-46-F	8604	8592	12	0	0	0	0	0	0	0

**NITROGEN DIOXIDE, WEST CENTRAL REGION**  
**ANNUAL ARITHMETIC MEAN**  
**19-A6, Vinton Elementary School, Vinton**

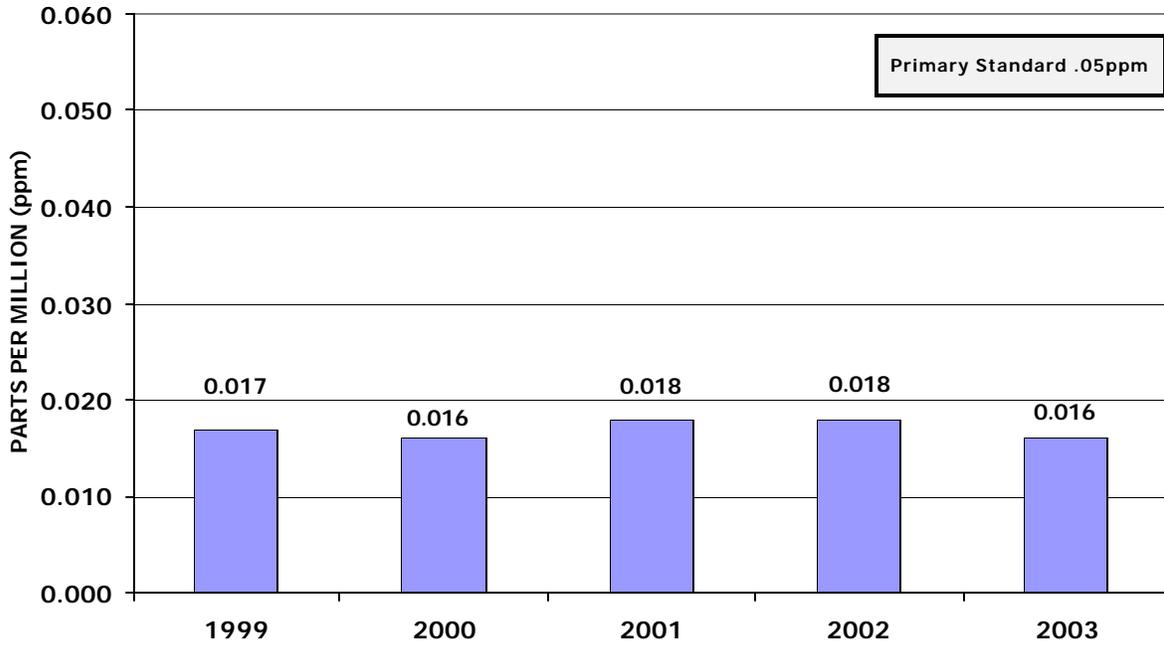


**NITROGEN DIOXIDE, PIEDMONT REGION**  
**ANNUAL ARITHMETIC MEAN**  
**75-B, Charles City County**

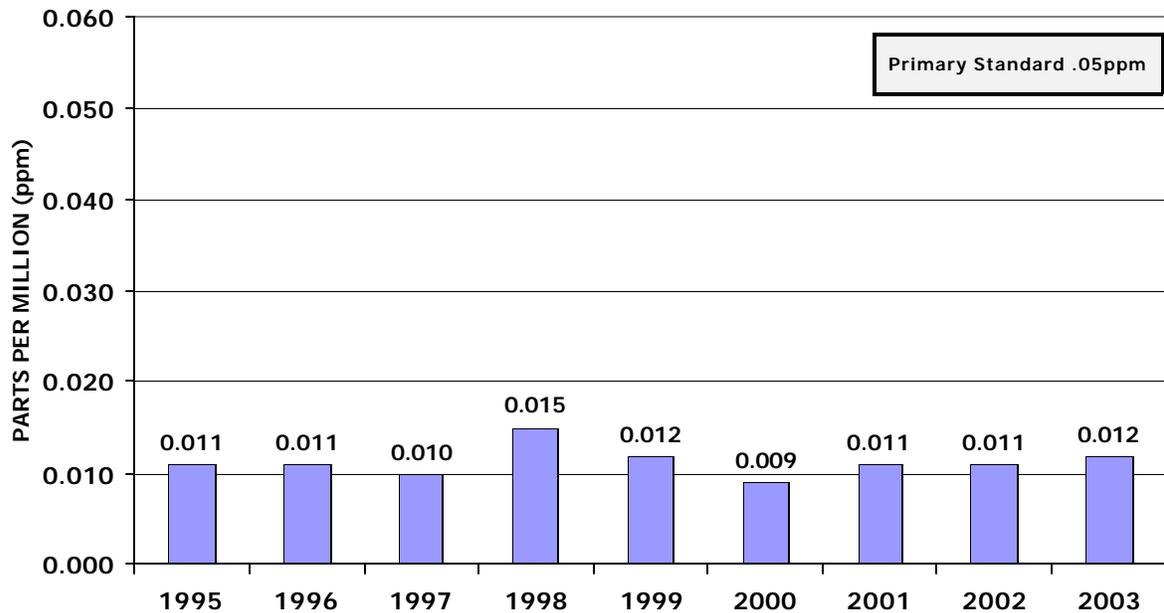




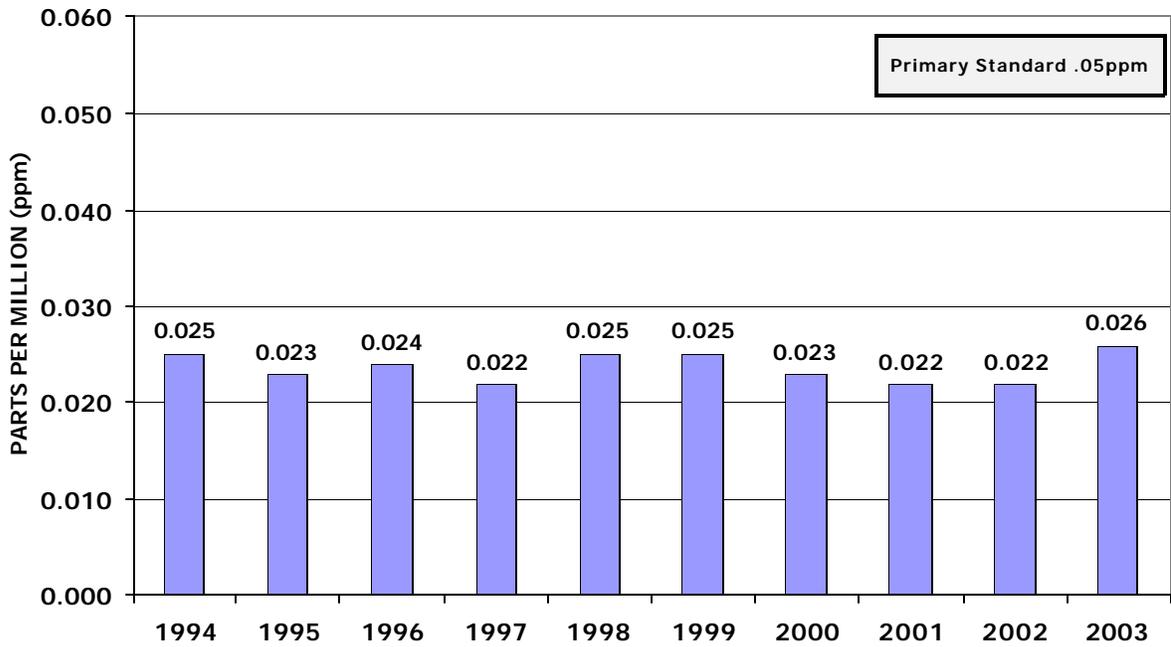
**NITROGEN DIOXIDE, NORTHERN REGION**  
**ANNUAL ARITHMETIC MEAN**  
**38-I, Broad Run High School, Ashburn**



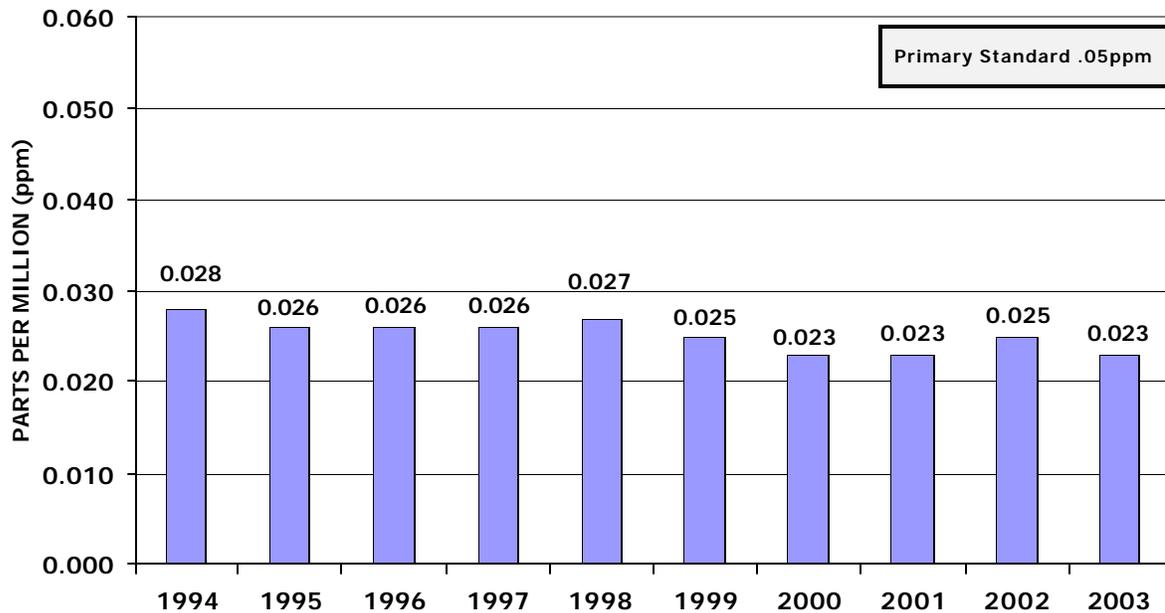
**NITROGEN DIOXIDE, NORTHERN REGION**  
**ANNUAL ARITHMETIC MEAN**  
**45-L, Long Park, Prince William County**



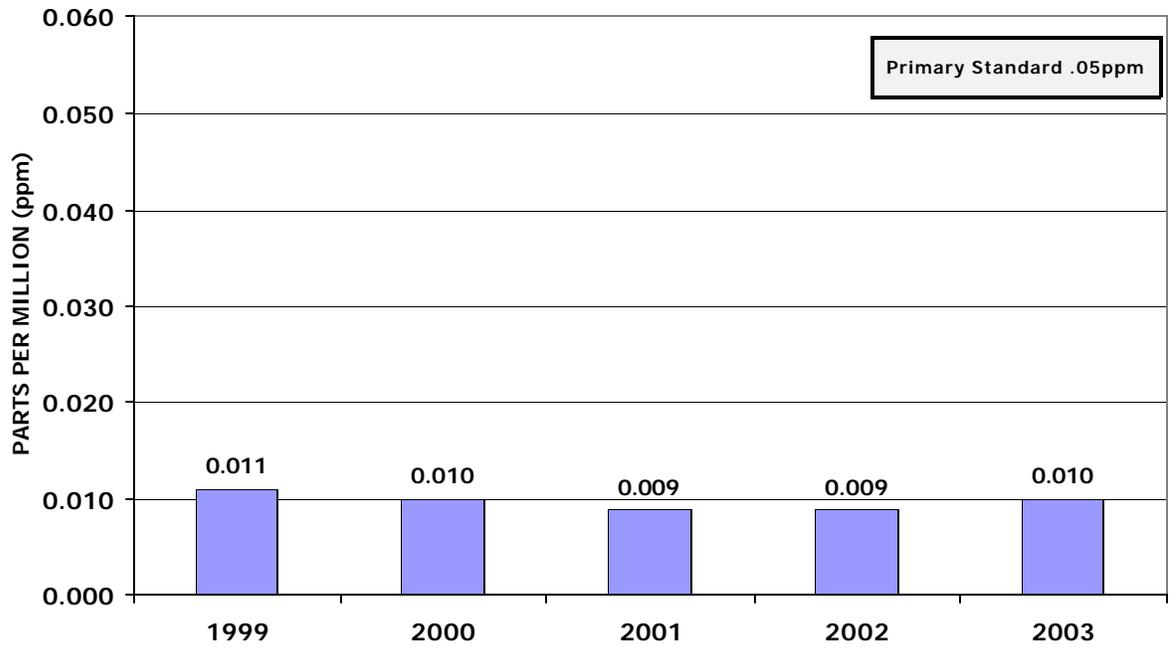
**NITROGEN DIOXIDE, NORTHERN REGION**  
**ANNUAL ARITHMETIC MEAN**  
**47-T, Aurora Hills Visitors Center, Arlington County**



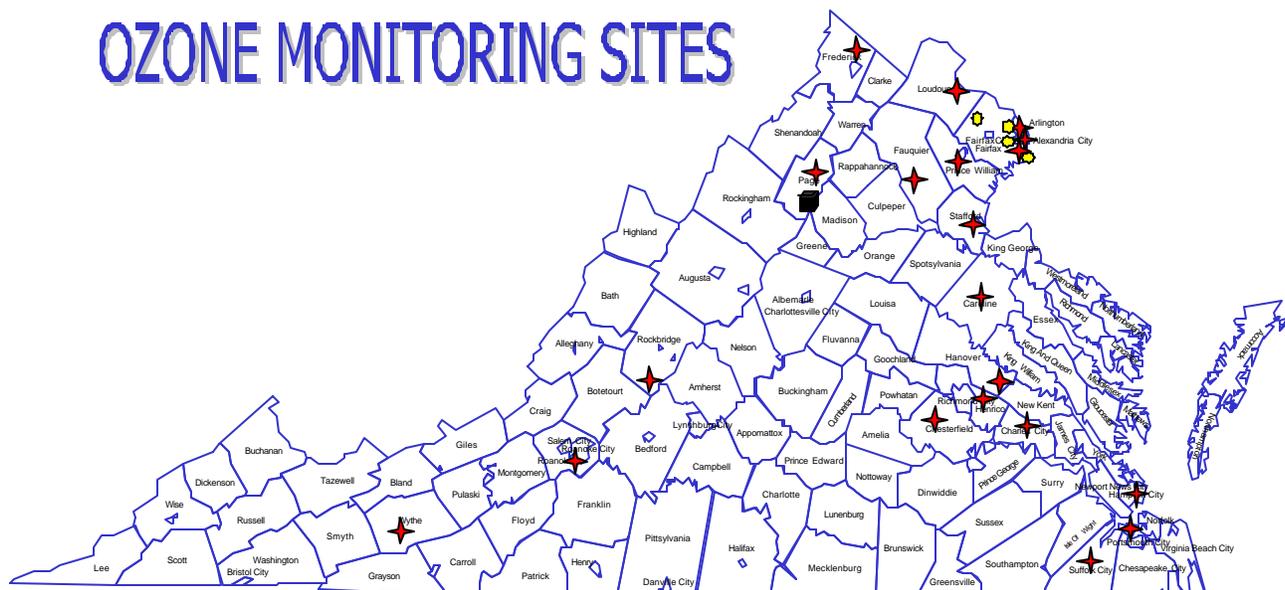
**NITROGEN DIOXIDE, ALEXANDRIA**  
**ANNUAL ARITHMETIC MEAN**  
**L-126-C, 517 North Saint Asaph Street**



**NITROGEN DIOXIDE, FAIRFAX COUNTY**  
**ANNUAL ARITHMETIC MEAN**  
**L-46-F, Upper Cub Run Sewage Treatment Plant, Fairfax County**



# OZONE MONITORING SITES



## Reporting Organizations

-  VA Department of Environmental Quality
-  Fairfax County Health Department
-  National Park Service

**OZONE** ( $O_3$ ) is formed by a complex series of reactions among nitrogen oxides and certain organic compounds under the influence of solar ultraviolet radiation (sunlight). Ozone shows a very strong diurnal (daily) and seasonal (April to October) cyclical character. Ozone injures vegetation, has adverse effects on materials (rubber and fabrics) and is a pulmonary irritant that affects the respiratory mucous membranes, lung tissues and respiratory functions.

Ozone is measured continuously by ultraviolet absorption photometry. Air is drawn continuously through a sample cell where narrow band ultraviolet light (254nm wavelength) passes through it. The proportion of light absorbed by ozone molecules in the air is converted into an electrical signal and recorded.

The National Park Service operated one ozone monitor in Shenandoah National Park in 2002. The data from this site may be obtained from the National Park Service or by internet at <http://www2.nature.nps.gov/ard/gas/netdata1.htm>.

Hourly ozone values for monitoring sites in the state can be viewed for the months of April to October on the DEQ web page at <http://www.deq.state.va.us/ozone>. In addition, animated ozone maps for Virginia and other parts of the United States are available at <http://www.epa.gov/airnow>.

**VIRGINIA 2003**  
**OZONE SUMMARY BY REGION**  
**METHOD 19 - INSTRUMENTAL ULTRAVIOLET**  
**Parts Per Million (ppm), Eastern Standard Time**  
**Ozone Season - April through October**

LOCATION/ STATION NO.	NO. 8-HR OBS.	FOUR HIGHEST DAILY MAXIMUM 8-HOUR AVERAGE VALUES								DAYS >.08	
		1ST MAX	DATE	2ND MAX	DATE	3RD MAX	DATE	4TH MAX	DATE		
<b>SOUTHWEST REGION</b>											
WYTHE CO. 16-B Rural Retreat Sewage Disposal	5051	.095	JUN 26	.089	APR 15	.083	APR 14	.081	JUN 25	2	
<b>VALLEY REGION</b>											
ROCKBRIDGE CO. 21-C Natural Bridge Ranger Station	5098	.083	APR 15	.079	APR 16	.075	APR 14	.075	JUN 24	0	
FREDERICK CO. 28-J Rest	5126	.094	JUN 25	.083	JUN 24	.081	JUL 30	.079	APR 15	1	
PAGE CO. 29-D Luray Caverns Airport	5124	.104	JUN 25	.091	JUN 24	.085	JUN 26	.083	APR 15	3	
<b>WEST CENTRAL REGION</b>											
ROANOKE CO. 19-A6 East Vinton Elementary Sch.	5115	.091	JUN 25	.080	APR 15	.077	APR 16	.077	JUN 24	1	
<b>PIEDMONT REGION</b>											
CHARLES CITY CO. 75-B Route 608	4833	.099	JUN 25	.094	JUN 26	.080	APR 30	.079	AUG 27	2	
CHESTERFIELD CO. 71-H Beach Road	4874	.104	JUN 24	.098	JUN 25	.085	JUN 26	.079	AUG 28	3	
HENRICO CO. 72-M Math and Science Center	4942	.100	JUN 25	.091	JUN 26	.086	JUN 24	.083	APR 30	3	
HANOVER CO. 73-E McClellan Road	4875	.099	JUN 26	.098	JUN 25	.090	AUG 26	.086	APR 16	4	

**VIRGINIA 2003  
OZONE SUMMARY BY REGION  
METHOD 19 AND 47 - INSTRUMENTAL ULTRAVIOLET  
Parts Per Million (ppm), Eastern Standard Time  
Ozone Season - April through October**

LOCATION/ STATION NO.	NO. 8-HR OBS.	FOUR HIGHEST DAILY MAXIMUM 8-HOUR AVERAGE VALUES									DAYS >.08
		1ST MAX	DATE	2ND MAX	DATE	3RD MAX	DATE	4TH MAX	DATE		
<b>TIDEWATER REGION</b>											
HAMPTON Virginia School	179-C	5052	.112	JUN 26	.096	JUN 25	.084	JUN 27	.083	JUN 24	2
SUFFOLK Tidewater Comm. College	183-E	4976	.110	JUN 26	.094	JUN 25	.087	JUN 24	.083	JUN 27	3
SUFFOLK Tidewater Research Station	183-F	5055	.097	JUN 26	.092	JUN 25	.087	JUN 27	.079	JUN 24	3
<b>NORTHERN REGION</b>											
ARLINGTON CO. Aurora Hills Visitors Center	47-T	4969	.115	JUN 25	.106	JUN 26	.092	JUN 24	.087	AUG 14	4
CAROLINE CO. U.S.G.S. Geomagnetic Center	48-A	4977	.107	JUN 25	.101	JUN 24	.089	JUN 26	.081	APR 16	3
FAIRFAX CO. Lee District Park	46-B9	4985	.123	JUN 25	.105	JUN 26	.099	JUN 24	.089	AUG 14	5
FAUQUIER CO. Phelps Wildlife Area	37-B	5047	.097	JUN 25	.083	JUN 24	.076	APR 14	.076	APR 15	1
LOUDOUN CO. Broad Run High School	38-I	5120	.116	JUN 25	.095	JUN 24	.093	JUN 26	.083	APR 16	3

**VIRGINIA 2003**  
**OZONE SUMMARY BY REGION**  
**METHOD 19 - INSTRUMENTAL ULTRAVIOLET**  
**Parts Per Million (ppm), Eastern Standard Time**  
**Ozone Season - April through October**

LOCATION/ STATION NO.	NO. 8-HR OBS.	FOUR HIGHEST DAILY MAXIMUM 8-HOUR AVERAGE VALUES								DAYS >.08	
		1ST MAX	DATE	2ND MAX	DATE	3RD MAX	DATE	4TH MAX	DATE		
<b>NORTHERN REGION (CONT.)</b>											
PRINCE WILLIAM CO. 45-L Long Park	5115	.109	JUN 25	.092	JUN 26	.088	JUN 24	.086	AUG 28	4	
STAFFORD CO. 44-A Widewater Elementary School	5021	.109	JUN 25	.099	JUN 24	.089	JUN 26	.085	APR 16	4	
ALEXANDRIA L-126-C 517 North Saint Asaph Street	5115	.107	JUN 25	.096	JUN 26	.095	AUG 14	.083	JUN 24	3	
<b>FAIRFAX CO. HEALTH DEPT.</b>											
FAIRFAX CO. L-46-A8 1437 Balls Hill Road	6386	.112	JUN 25	.095	JUN 26	.089	JUN 24	.075	JUN 30	3	
FAIRFAX CO. L-46-B3 2675 Sherwood Hall Lane	6490	.120	JUN 25	.103	JUN 26	.095	AUG 14	.091	JUN 24	5	
FAIRFAX CO. L-46-C1 Mason Governmental Center	6551	.119	JUN 25	.105	JUN 26	.094	JUN 24	.083	APR 16	3	
FAIRFAX CO. L-46-F Upper Cub Run Sewage Treatment Plant	6500	.103	JUN 25	.087	JUN 26	.083	APR 16	.083	JUN 24	2	

\* New Station

**1996-2003**  
**VIRGINIA'S 4TH HIGHEST OZONE 8-HOUR AVERAGE**  
**Parts Per Million (ppm)**

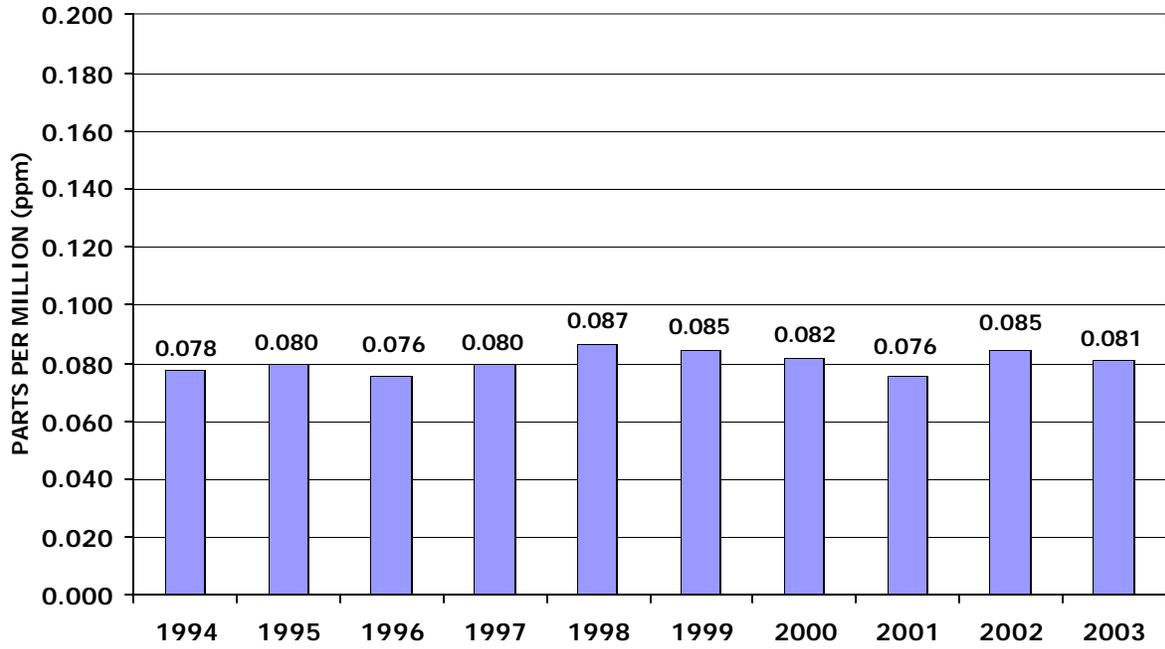
LOCATION	STATION NUMBER	1996	1997	1998	1999	2000	2001	2002	2003
WYTHE CO., Rural Retreat	16-B	.076	.080	.087	.085	.082	.076	.085	.081
ROCKBRIDGE CO., Natural Bridge Ranger Station	21-C	--	--	--	.081	.077	.082	.078	.075
FREDERICK CO., Rest	28-J	.080	.088	.098	.085	.079	.086	.091	.079
PAGE CO., Luray Caverns Airport	29-D	--	--	--	.086	.076	.086	.079	.083
ROANOKE CO., East Vinton Elementary School	19-A6	.073	.084	.099	.089	.081	.089	.091	.077
HANOVER CO., McClellan Road	73-E	--	--	--	--	--	.091	.106	.086
CHESTERFIELD CO., Beach Road	71-H	.083	.090	.090	.093	.080	.086	.093	.079
HENRICO CO., Math & Science Center	72-M	.084	.098	.096	.096	.083	.091	.098	.083
CHARLES CITY CO., Route 608	75-B	.084	.100	.092	.097	.076	.089	.105	.079
HAMPTON, Virginia School	179-C	.083	.097	.090	.097	.081	.085	.102	.083
SUFFOLK, Tidewater Community College	183-E	.075	.091	.087	0.94	.081	.085	.098	.083
SUFFOLK, Holland	183-F	.074	.088	.087	.091	.084	.075	.092	.079
FAUQUIER CO., Phelps Wildlife Area	37-B	.078	.083	.093	.088	.077	.082	.084	.076
LOUDOUN CO., Broad Run High School	38-I	--	--	.102	.090	.077	.093	.102	.083
STAFFORD CO., Widewater Elementary School	44-A	.081	.091	.092	.092	.079	.086	.094	.085
PRINCE WILLIAM CO., Long Park	45-L	.082	.086	.098	.089	.079	.089	.087	.086

**1996-2003  
VIRGINIA'S 4TH HIGHEST OZONE 8-HOUR AVERAGE  
Parts Per Million (ppm)**

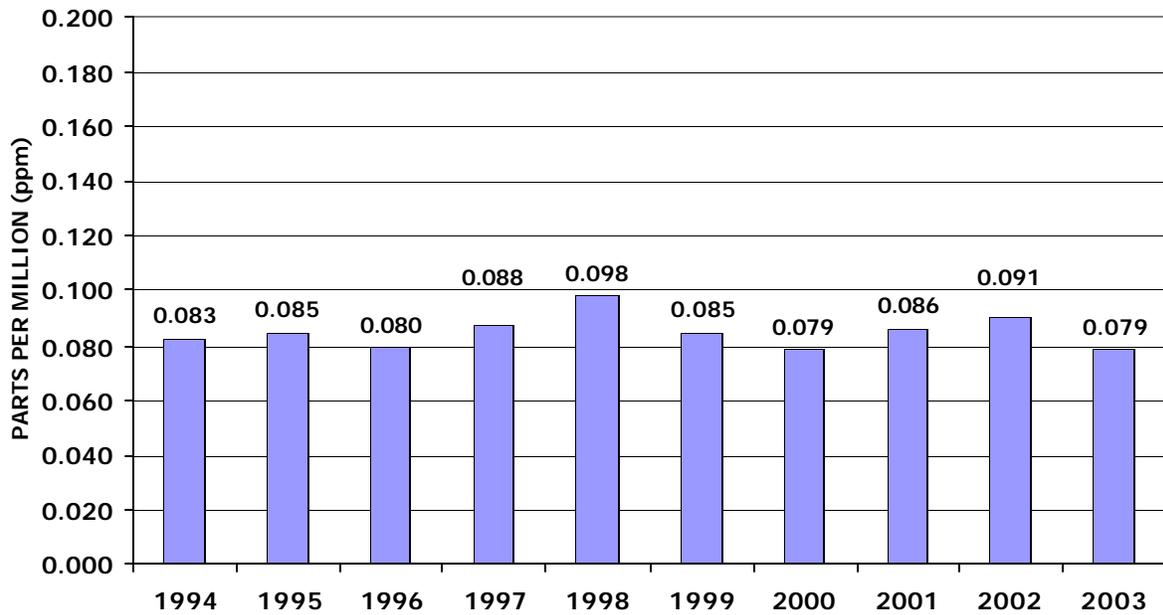
LOCATION	STATION NUMBER	1996	1997	1998	1999	2000	2001	2002	2003
FAIRFAX CO., Lee District Park	46-B9	--	--	.097	.099	.070	.096	.108	.089
ARLINGTON CO., Aurora Hills Visitors Center	47-T	.084	.094	.098	.100	.080	.098	.112	.087
CAROLINE CO., Corbin	48-A	.080	.091	.095	.091	.078	.086	.085	.081
ALEXANDRIA., 517 N. St. Asaph Street	L-126-C	.070*	.085	.094	.096	.077	.091	.103	.083
FAIRFAX CO., 1437 Balls Hill Road, McLean	L-46-A8	.077	.080	.090	.087	.082	.090	.099	.075
FAIRFAX CO., Mount Vernon	L-46-B3	.089	.088	.101	.100	.092	.095	.106	.091
FAIRFAX CO., Mason Govt. Center	L-46-C1	--	--	--	--	--	--	.108	.083
FAIRFAX CO., Upper Cub Run, Chantilly	L-46-F	.079	.079	.103	.092	.079	.093	.092	.083

\* Did not meet EPA's minimum data capture requirements.

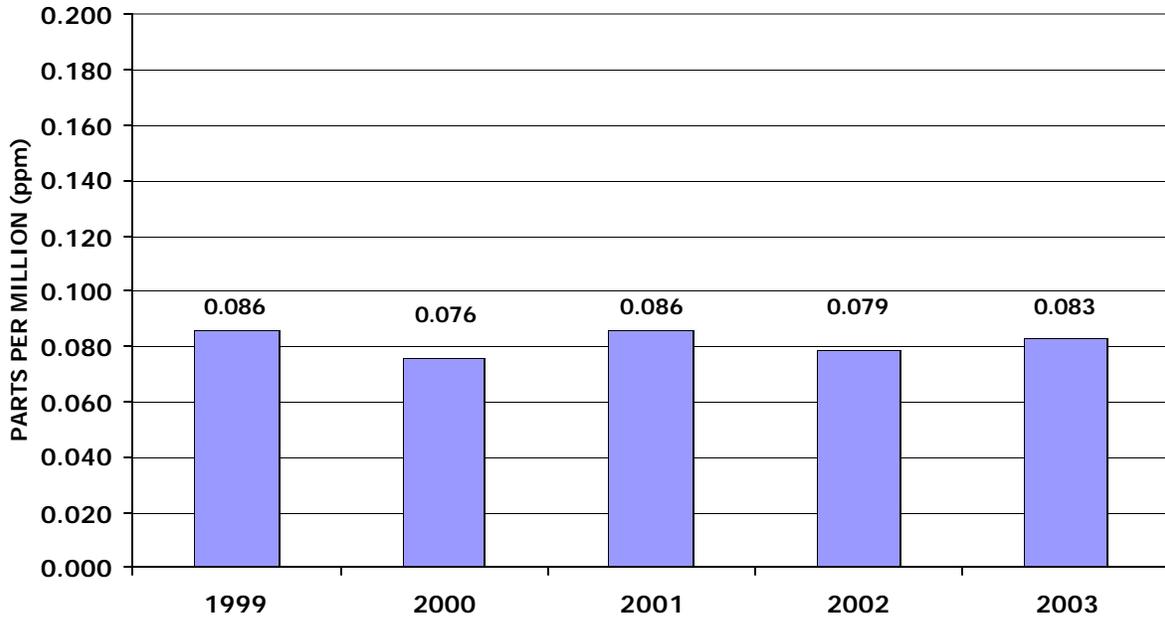
**OZONE, SOUTHWEST REGION**  
**4TH DAILY MAXIMUM, 8-HOUR VALUE**  
**16-B, Rural Retreat, Wythe County**



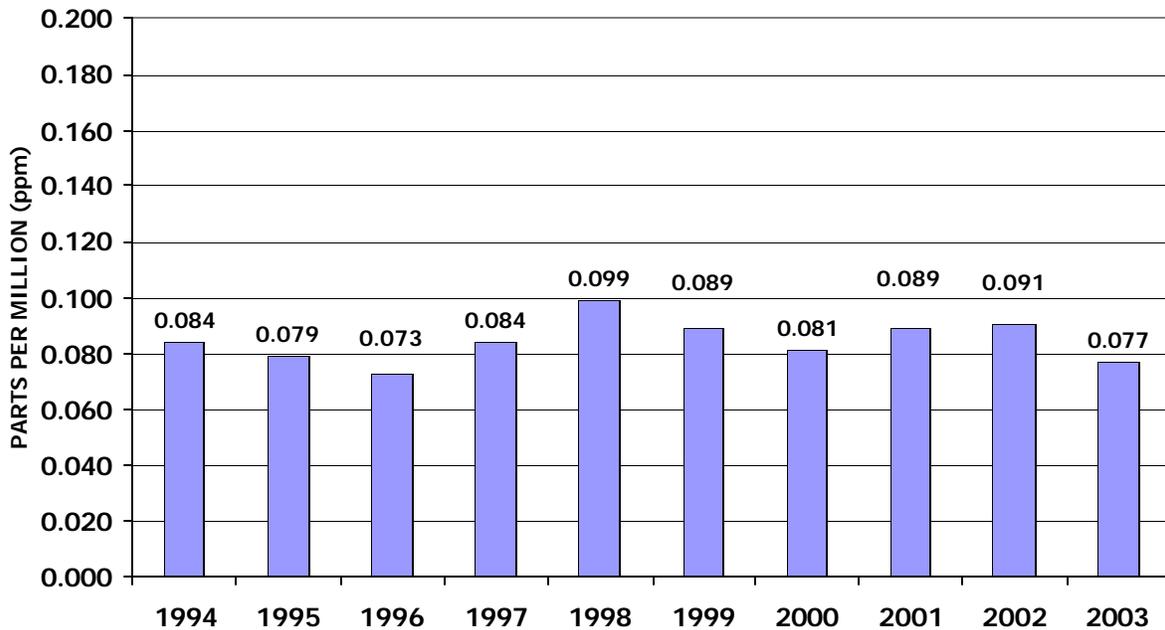
**OZONE, VALLEY REGION**  
**4TH DAILY MAXIMUM, 8-HOUR VALUE**  
**28-J, Rest, Frederick County**



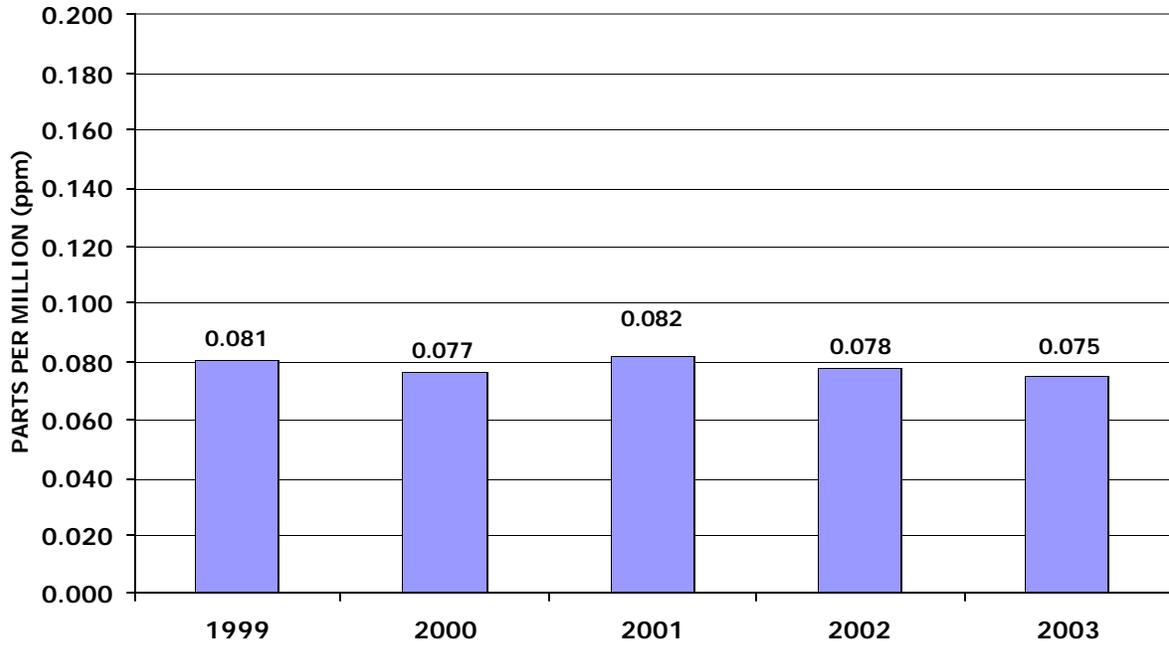
**OZONE, PIEDMONT REGION**  
**4TH DAILY MAXIMUM, 8-HOUR VALUE**  
**29-D, Luray Caverns Airport, Page County**



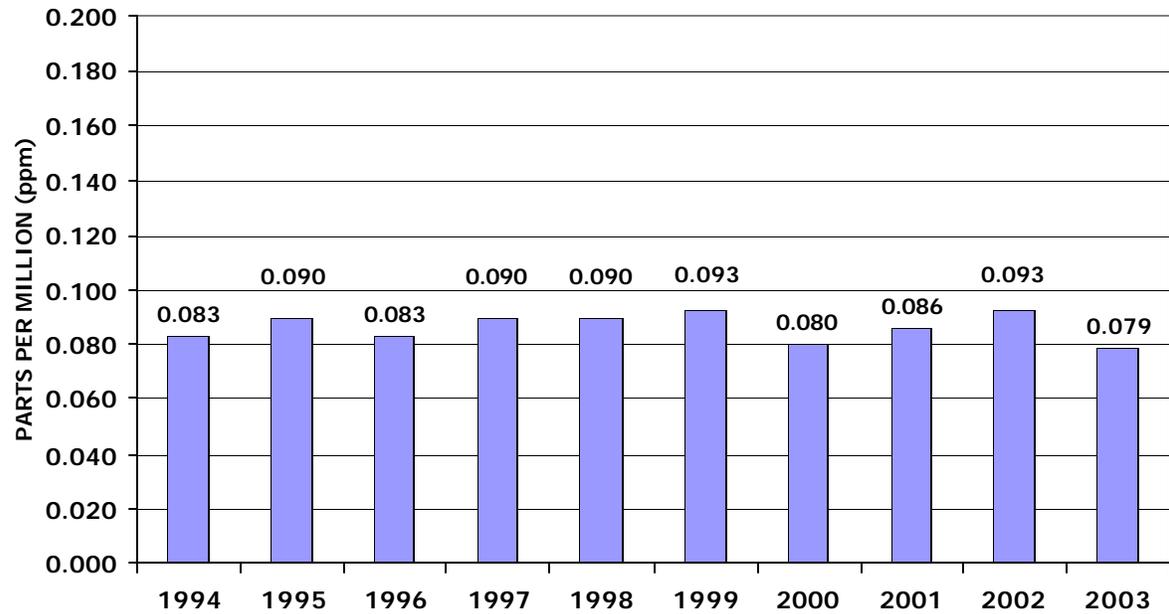
**OZONE, WEST CENTRAL REGION**  
**4TH DAILY MAXIMUM, 8-HOUR VALUE**  
**19-A6, Vinton Elementary School, Roanoke Co.**



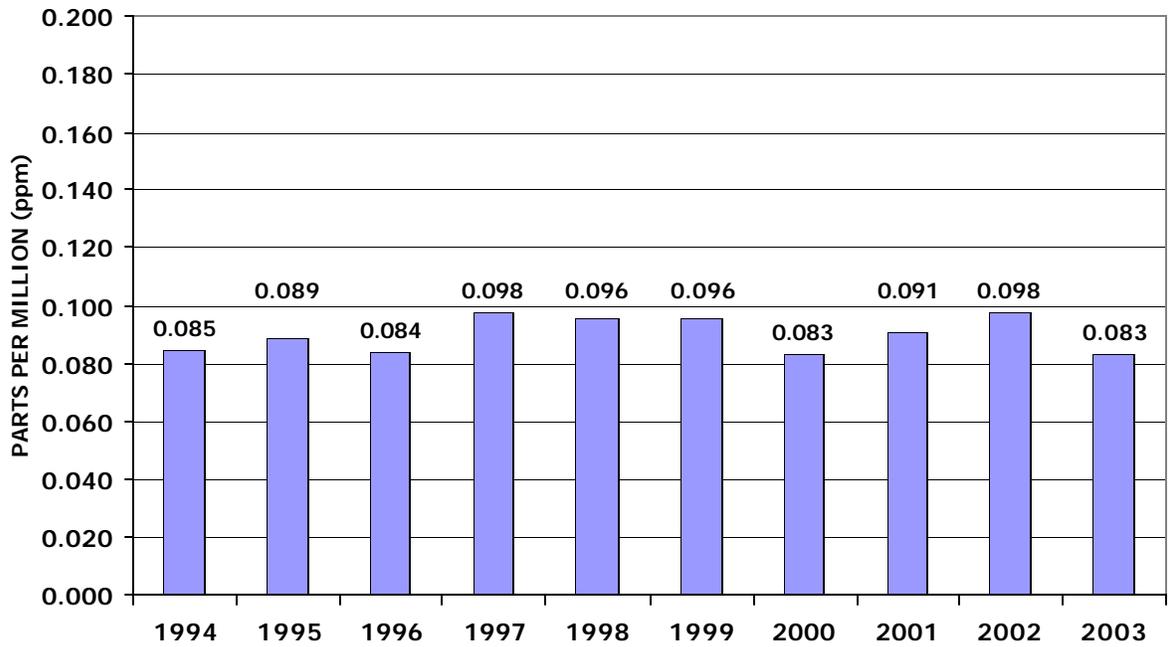
**OZONE, WEST CENTRAL REGION**  
**4TH DAILY MAXIMUM, 8-HOUR VALUE**  
**21-C, Natural Bridge Ranger Station, Rockbridge Co.**



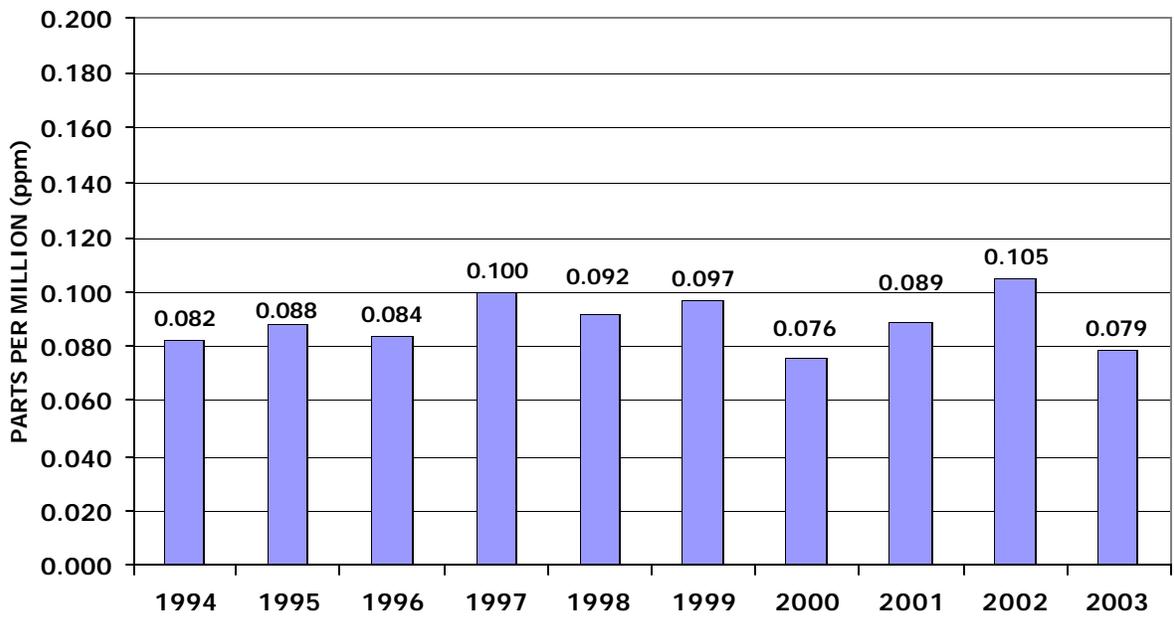
**OZONE, PIEDMONT REGION**  
**4TH DAILY MAXIMUM, 8-HOUR VALUE**  
**71-H, Beach Road, Chesterfield County**



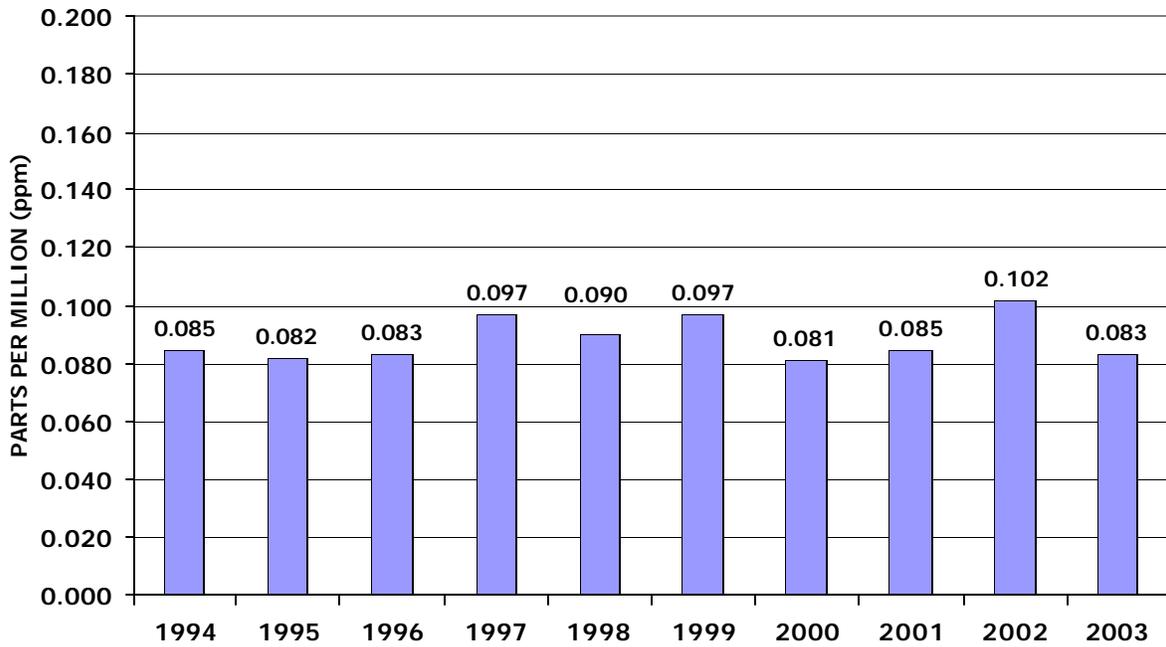
**OZONE, PIEDMONT REGION**  
**4TH DAILY MAXIMUM, 8-HOUR VALUE**  
**72-M, Math & Science Center, Henrico County**



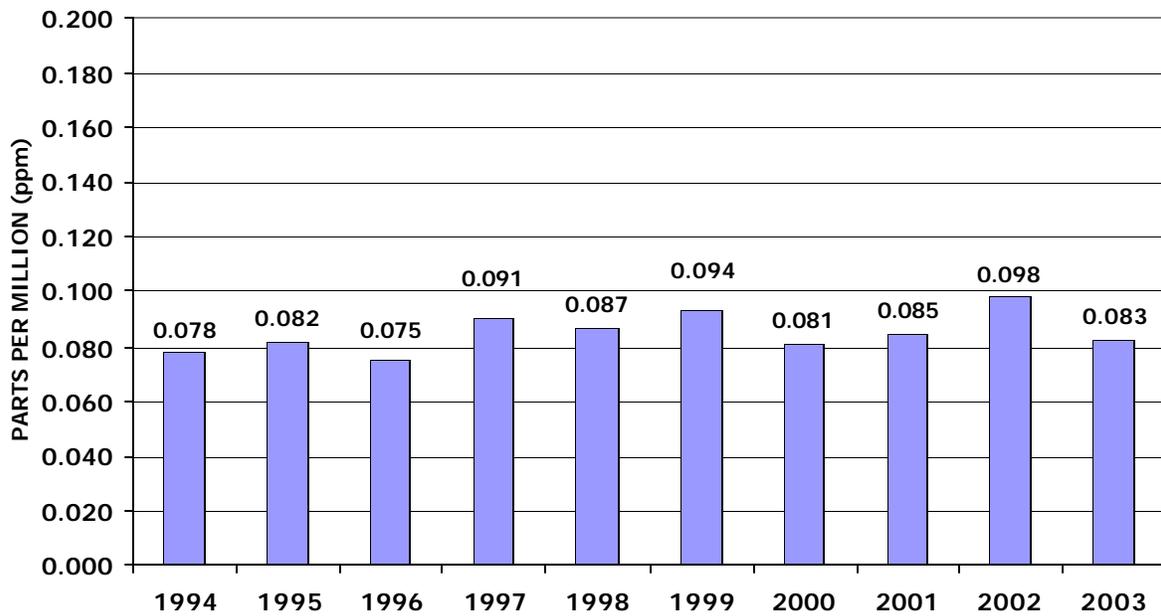
**OZONE, PIEDMONT REGION**  
**4TH DAILY MAXIMUM, 8-HOUR VALUE**  
**75-B, Route 608, Charles City County**



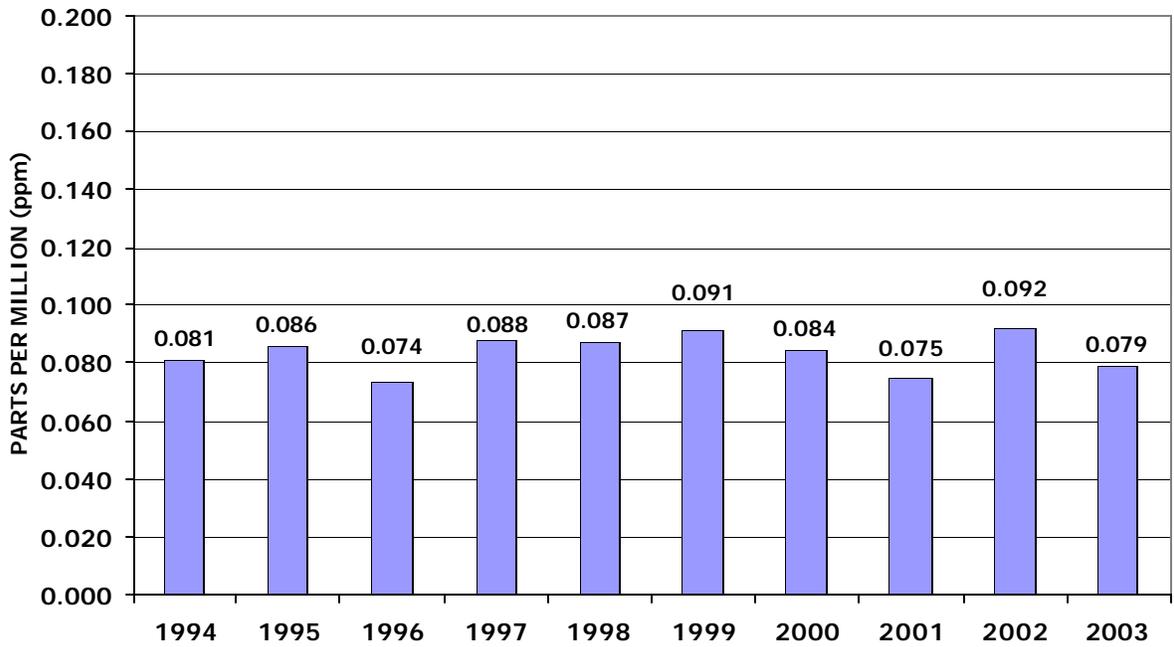
**OZONE, TIDEWATER REGION**  
**4TH DAILY MAXIMUM, 8-HOUR VALUE**  
179-C, Virginia School, Hampton



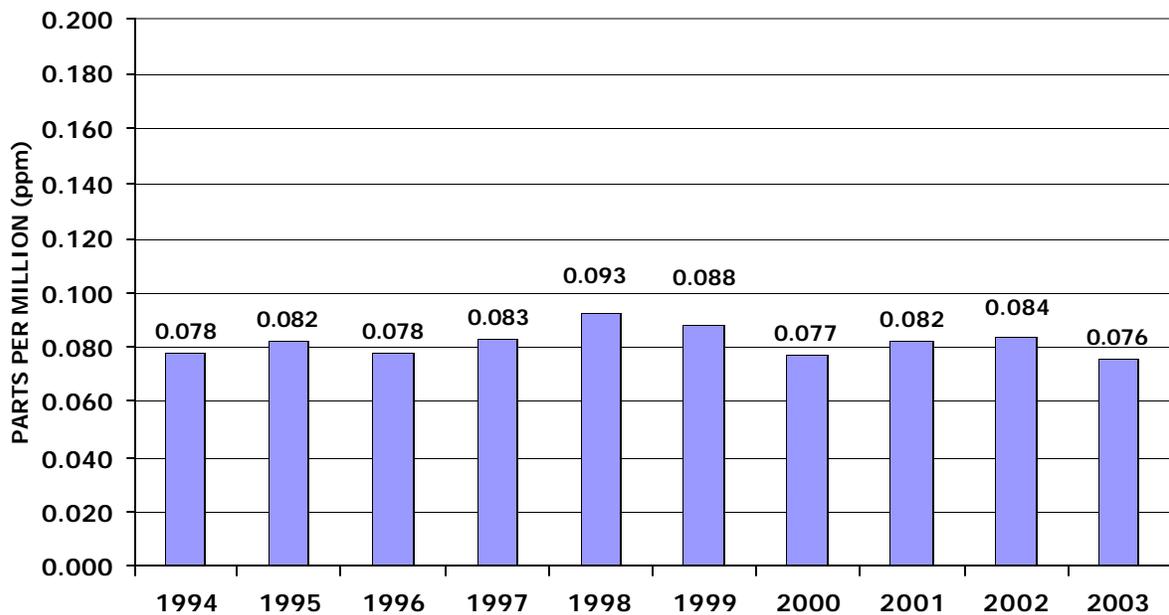
**OZONE, TIDEWATER REGION**  
**4TH DAILY MAXIMUM, 8-HOUR VALUE**  
183-E, Tidewater Community College, Suffolk



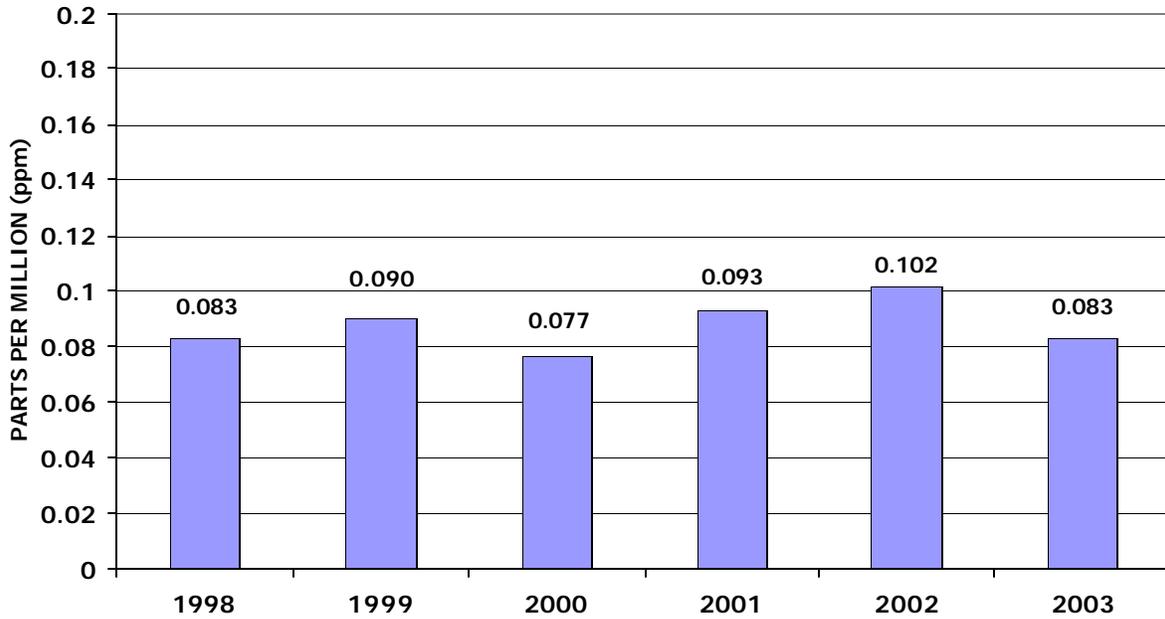
**OZONE, TIDEWATER REGION**  
**4TH DAILY MAXIMUM, 8-HOUR VALUE**  
**183-F, Holland, Suffolk**



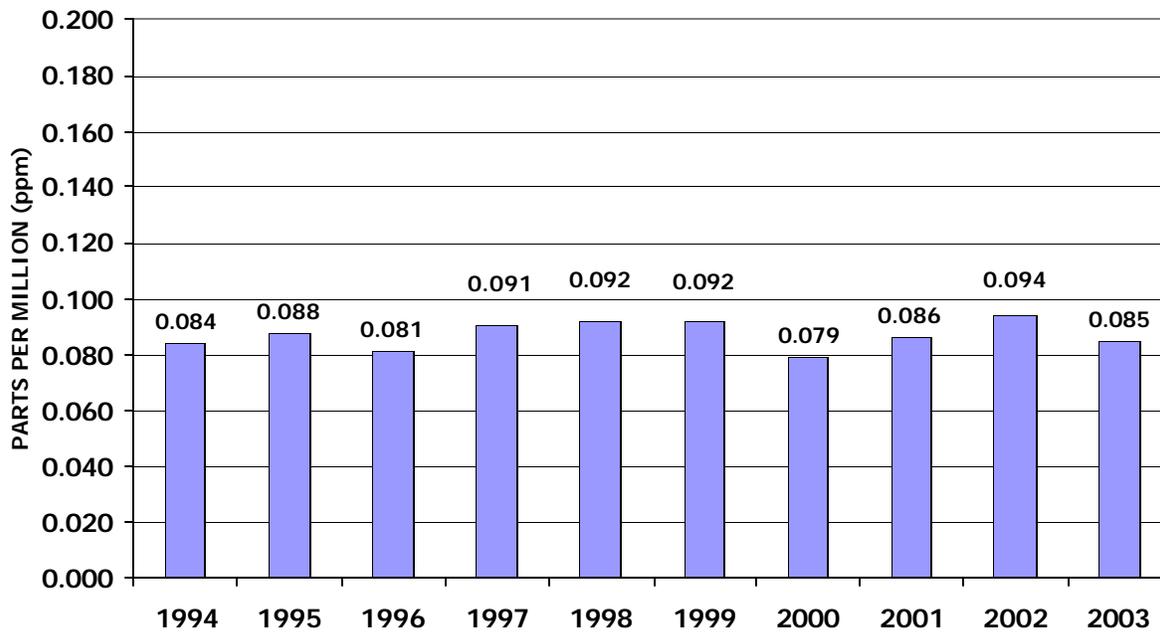
**OZONE, NORTHERN REGION**  
**4TH DAILY MAXIMUM, 8-HOUR VALUE**  
**37-B, Phelps Wildlife Area, Fauquier County**



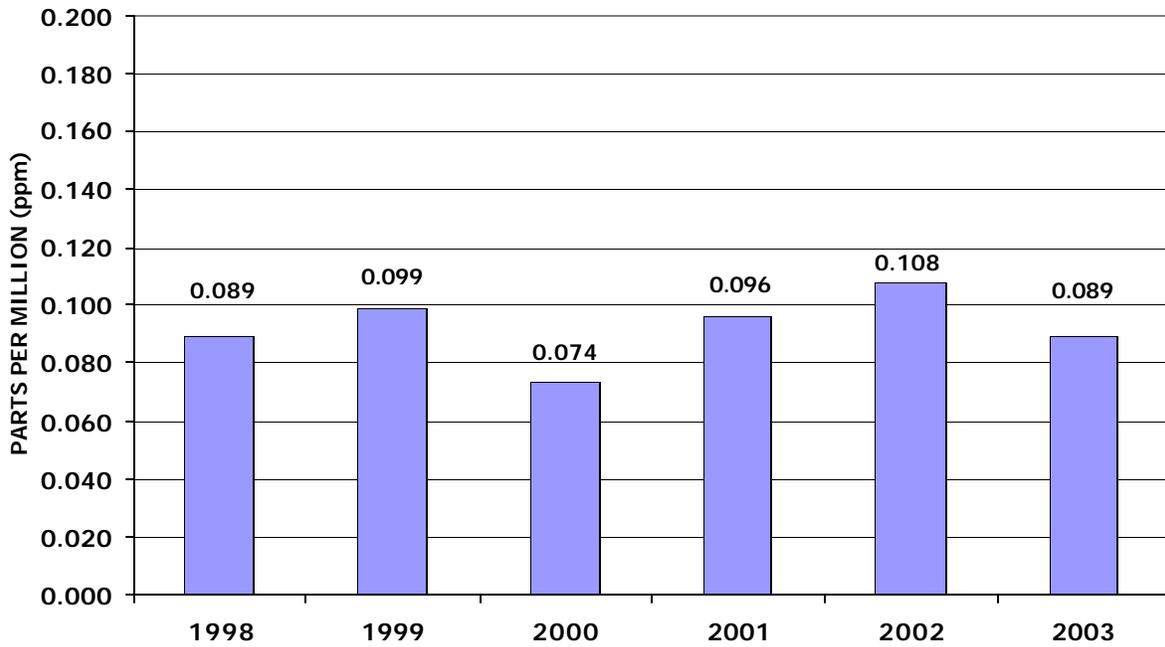
**OZONE, NORTHERN REGION**  
**4TH DAILY MAXIMUM, 8-HOUR VALUE**  
**38-I, Broad Run High School, Ashburn**



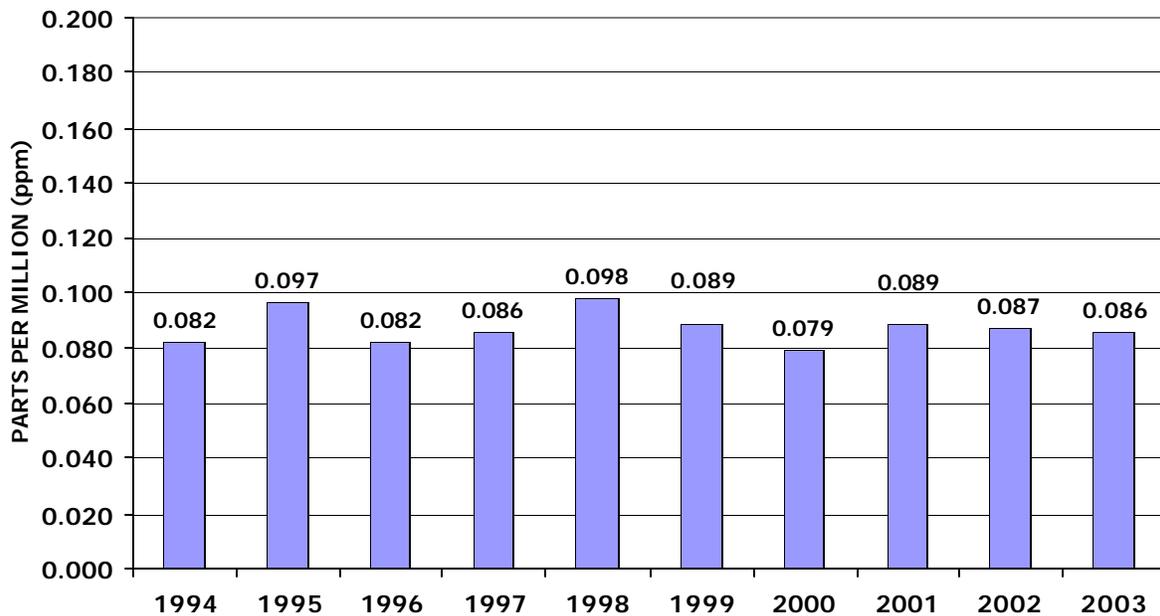
**OZONE, NORTHERN REGION**  
**4TH DAILY MAXIMUM, 8-HOUR VALUE**  
**44-A, Widewater Elementary School, Stafford County**



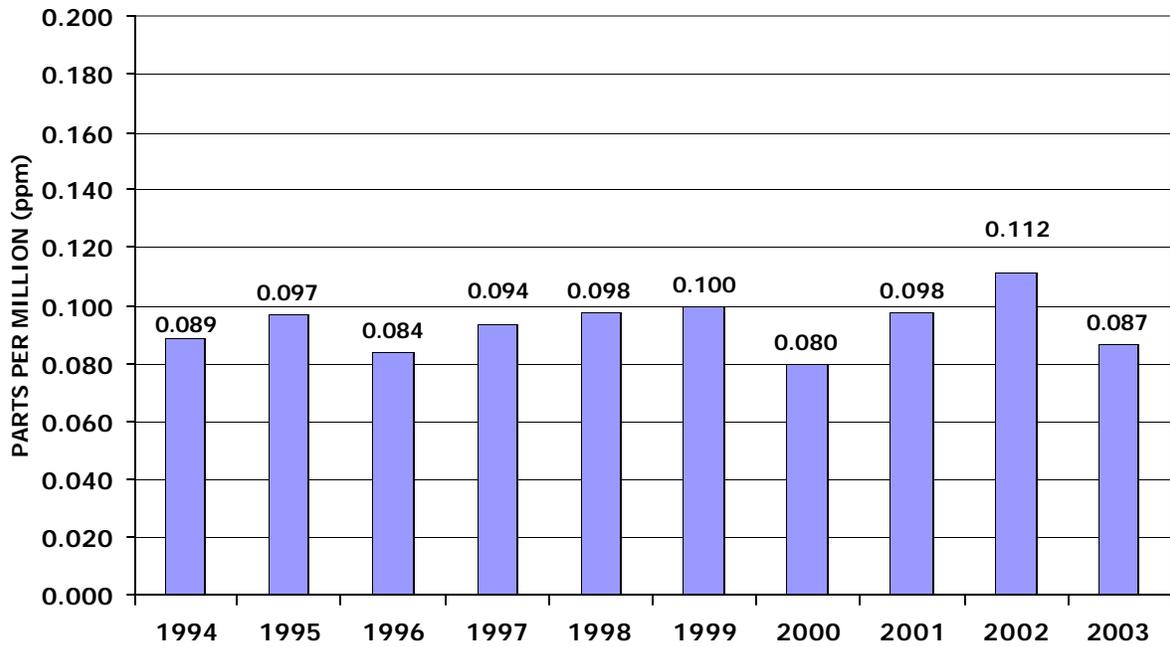
**OZONE, NORTHERN REGION**  
**4TH DAILY MAXIMUM, 8-HOUR VALUE**  
**46-B9, Lee District Park, Fairfax County**



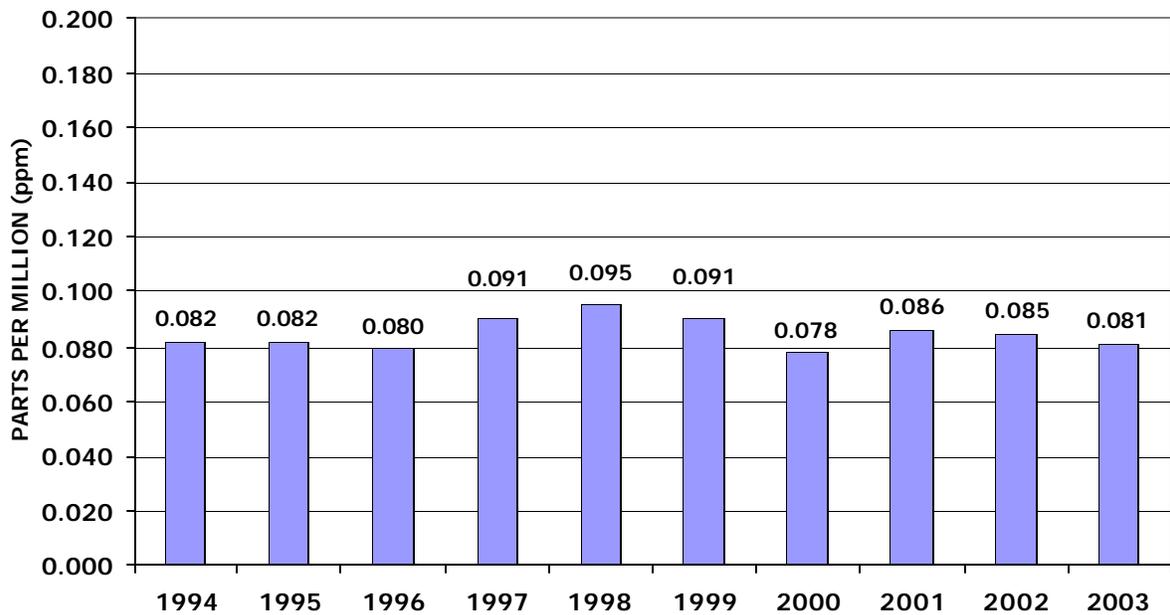
**OZONE, NORTHERN REGION**  
**4TH DAILY MAXIMUM, 8-HOUR VALUE**  
**45-L, Long Park, Prince William County**



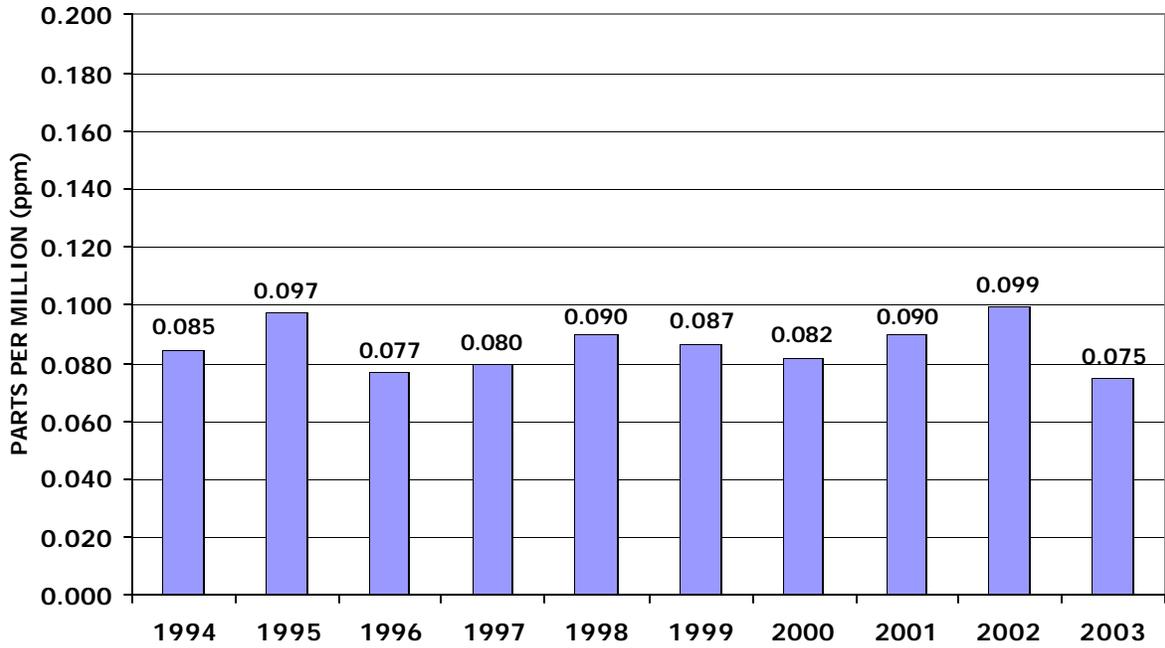
**OZONE, NORTHERN REGION**  
**4TH DAILY MAXIMUM, 8-HOUR VALUE**  
**47-T, Aurora Hills Visitors Center, Arlington County**



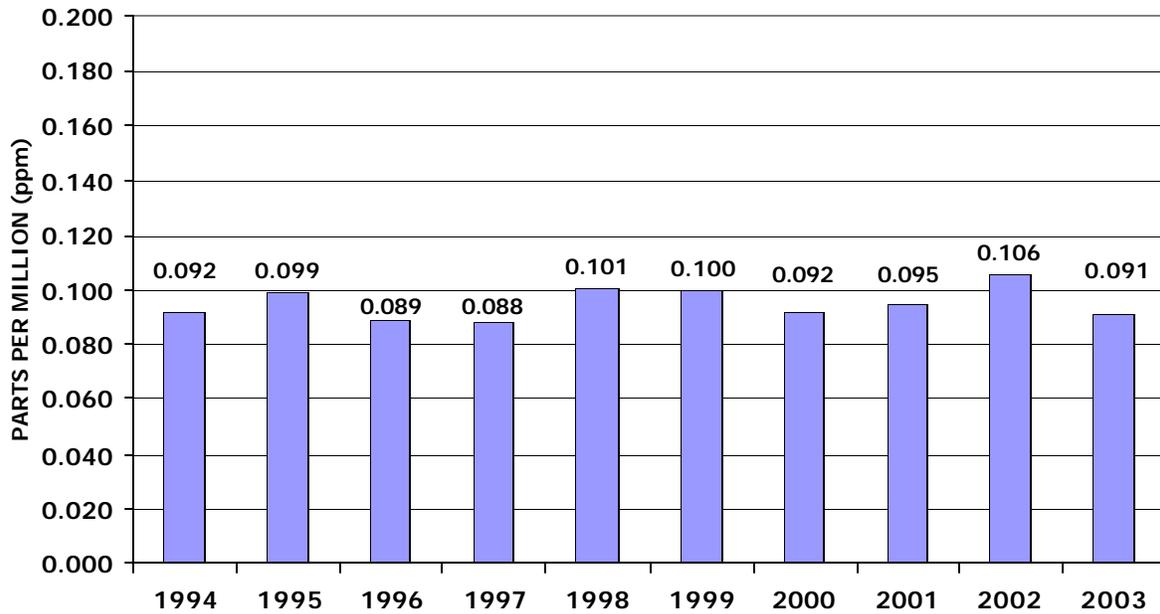
**OZONE, NORTHERN REGION**  
**4TH DAILY MAXIMUM, 8-HOUR VALUE**  
**48-A, Corbin, Caroline County**



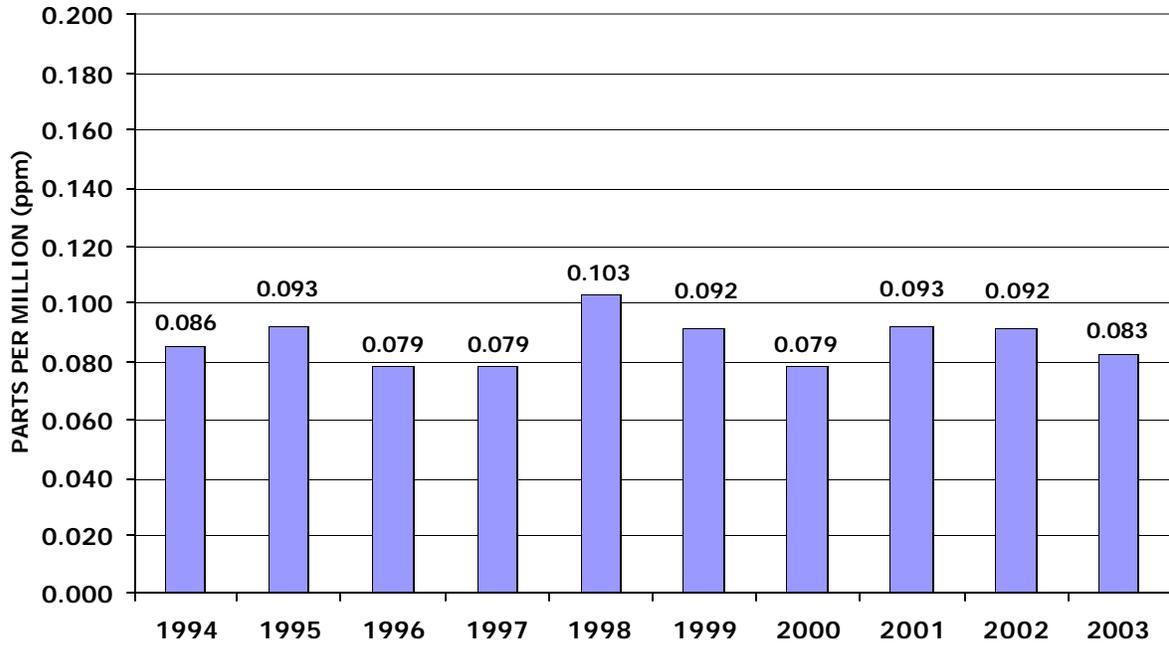
**OZONE, FAIRFAX COUNTY**  
**4TH DAILY MAXIMUM, 8-HOUR VALUE**  
**L-46-A8, 1437 Balls Hill Road, McLean**



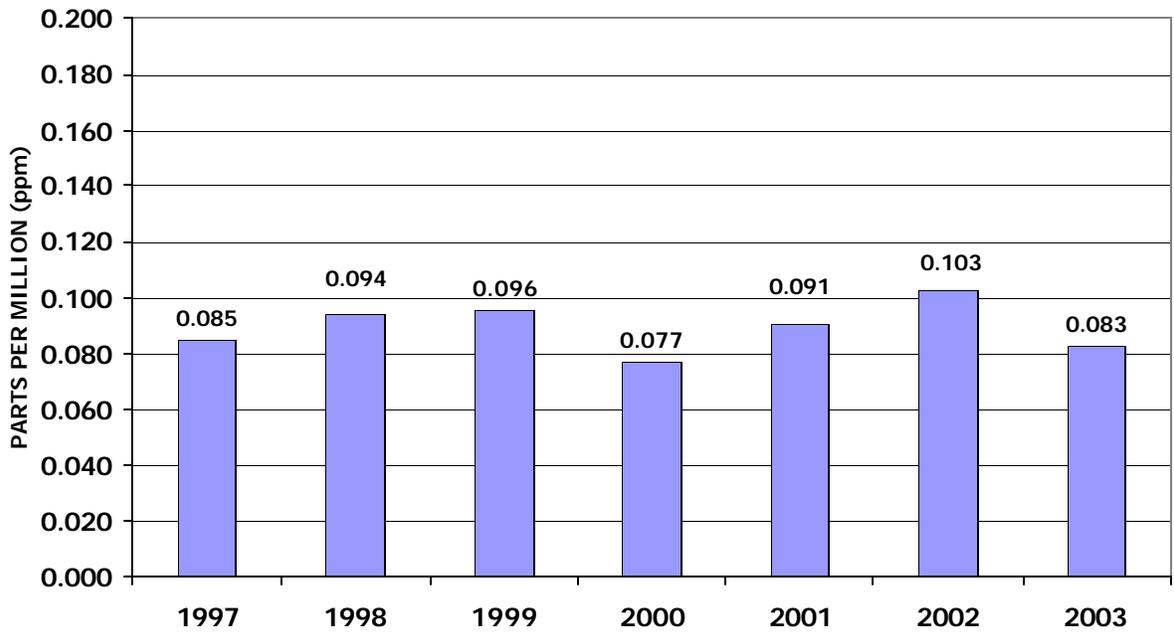
**OZONE, FAIRFAX COUNTY**  
**4TH DAILY MAXIMUM, 8-HOUR VALUE**  
**L-46-B3, 2675 Sherwood Hall Lane, Mt. Vernon**



**OZONE, FAIRFAX COUNTY**  
**4TH DAILY MAXIMUM, 8-HOUR VALUE**  
**L-46-F, Upper Cub Run Drive, Chantilly**



**OZONE, FAIRFAX COUNTY**  
**4TH DAILY MAXIMUM, 8-HOUR VALUE**  
**L-126-C, 517 North Saint Asaph St., Alexandria**



**VIRGINIA 2003**  
**OZONE SUMMARY BY REGION**  
**METHOD 19 - INSTRUMENTAL ULTRAVIOLET**  
**Parts Per Million (ppm)**  
**Ozone Season - April through October**

LOCATION/ STATION NO.	NO. 1-HR OBS.	FOUR HIGHEST DAILY MAXIMUM HOURLY VALUES									DAYS >.12
		1ST MAX	DATE TIME	2ND MAX	DATE TIME	3RD MAX	DATE TIME	4TH MAX	DATE TIME		
<b>SOUTHWEST REGION</b>											
WYTHE CO. 16-B Rural Retreat Sewage Disposal	4996	.102	JUN 26 3:00 PM	.092	APR 15 3:00 PM	.089	APR 14 7:00 PM	.085	JUN 25 2:00 PM	0	
<b>VALLEY REGION</b>											
ROCKBRIDGE CO. 21-C Natural Bridge	5058	.088	APR 15 4:00 PM	.085	JUN 24 NOON	.083	JUN 25 NOON	.082	APR 16 11:00 AM	0	
FREDERICK CO. 28-J Rest	5063	.103	JUN 25 NOON	.090	JUN 24 3:00 PM	.089	JUL 30 3:00 PM	.087	APR 15 3:00 PM	0	
PAGE CO. 29-D Luray Caverns Airport	5061	.111	JUN 25 NOON	.097	JUN 24 4:00 PM	.096	JUN 12 NOON	.090	JUN 26 3:00 PM	0	
<b>WEST CENTRAL REGION</b>											
ROANOKE CO. 19-A6 East Vinton Elementary Sch.	5063	.109	JUN 25 3:00 PM	.085	APR 15 NOON	.084	APR 16 NOON	.083	JUN 24 11:00 AM	0	
<b>PIEDMONT REGION</b>											
CHARLES CITY CO. 75-B Route 608	4798	.140	JUN 26 1:00 PM	.124	JUN 25 2:00 PM	.103	JUN 27 NOON	.102	AUG 27 3:00 PM	1	
CHESTERFIELD CO. 71-H Beach Road	4836	.123	JUN 24 2:00 PM	.113	JUN 25 11:00 AM	.102	JUN 26 11:00 AM	.097	AUG 28 3:00 PM	0	
HENRICO CO. 72-M Math & Science Center	4891	.111	JUN 25 NOON	.103	JUN 26 NOON	.097	JUN 24 4:00 PM	.097	JUN 30 1:00 PM	0	
HANOVER CO. 73-E McClellan Road	4830	.118	AUG 26 2:00 PM	.115	JUN 26 2:00 PM	.111	JUN 25 2:00 PM	.104	AUG 22 1:00 PM	0	

**VIRGINIA 2003  
OZONE SUMMARY BY REGION  
METHOD 19 AND 47 - INSTRUMENTAL ULTRAVIOLET  
Parts Per Million (ppm)  
Ozone Season - April through October**

LOCATION/ STATION NO.	NO. 1-HR OBS.	FOUR HIGHEST DAILY MAXIMUM HOURLY VALUES								DAYS >.12	
		1ST MAX	DATE TIME	2ND MAX	DATE TIME	3RD MAX	DATE TIME	4TH MAX	DATE TIME		
<b>TIDEWATER REGION</b>											
HAMPTON Virginia School	179-C	4995	.136	JUN 26 NOON	.102	JUN 25 1:00 PM	.096	JUN 24 2:00 PM	.091	AUG 26 NOON	1
SUFFOLK Tidewater Comm. College	183-E	4928	.125	JUN 26 1:00 PM	.102	JUN 24 2:00 PM	.099	JUN 25 1:00 PM	.098	AUG 26 NOON	1
SUFFOLK Tidewater Research Station	183-F	5017	.103	JUN 26 11:00 AM	.102	JUN 25 3:00 PM	.097	JUL 25 2:00 PM	.092	JUN 27 2:00 PM	0
<b>NORTHERN REGION</b>											
ARLINGTON CO. Aurora Hills Visitors Center	47-T	4913	.126	JUN 25 3:00 PM	.118	JUN 26 4:00 PM	.101	AUG 14 1:00 PM	.099	JUN 24 1:00 PM	1
CAROLINE CO. U.S.G.S. Geomagnetic Center	48-A	4926	.118	JUN 25 11:00 AM	.113	JUN 24 1:00 PM	.100	JUN 26 11:00 AM	.093	JUN 30 2:00 PM	0
FAUQUIER CO. Phelps Wildlife Area	37-B	4997	.106	JUN 25 1:00 PM	.089	JUN 24 NOON	.087	AUG 28 3:00 PM	.081	APR 14 2:00 PM	0
LOUDOUN CO. Broad Run High School	38-I	5064	.122	JUN 25 11:00 AM	.101	JUN 24 1:00 PM	.099	JUN 26 5:00 PM	.095	AUG 28 4:00 PM	0
PRINCE WILLIAM CO. Long Park	45-L	5056	.115	JUN 25 NOON	.105	AUG 28 3:00 PM	.095	JUN 26 NOON	.093	JUN 24 MIDNIGHT	0
FRANCONIA Lee District Park	46-B9	4935	.137	JUN 25 2:00 PM	.113	AUG 14 3:00 PM	.112	JUN 26 4:00 PM	.106	JUN 24 3:00 PM	1
STAFFORD CO. Widewater Elementary School	44-A	4981	.118	JUN 25 11:00 AM	.107	JUN 24 NOON	.097	JUN 26 NOON	.094	AUG 26 NOON	0

**VIRGINIA 2003  
 OZONE SUMMARY BY REGION  
 METHOD 19 - INSTRUMENTAL ULTRAVIOLET  
 Parts Per Million (ppm)  
 Ozone Season - April through October**

LOCATION/ STATION NO.	NO. 1-HR OBS.	FOUR HIGHEST DAILY MAXIMUM HOURLY VALUES								DAYS >.12	
		1ST MAX	DATE TIME	2ND MAX	DATE TIME	3RD MAX	DATE TIME	4TH MAX	DATE TIME		
<b>ALEXANDRIA</b>											
ALEXANDRIA L-126-C 517 North Saint Asaph St.	5076	.120	JUN 25 3:00 PM	.119	AUG 14 3:00 PM	.104	JUN 26 3:00 PM	.096	AUG 26 2:00 PM	0	
<b>FAIRFAX CO.</b>											
FAIRFAX CO. L-46-A8 1437 Balls Hill Road	6355	.118	JUN 25 3:00 PM	.105	JUN 26 1:00 PM	.091	JUN 24 5:00 PM	.089	AUG 28 3:00 PM	0	
FAIRFAX CO. L-46-B3 2675 Sherwood Hall Lane	6460	.132	JUN 25 2:00 PM	.127	AUG 14 3:00 PM	.110	JUN 26 3:00 PM	.106	JUN 30 4:00 PM	2	
FAIRFAX CO. L-46-C1 6507 Columbia Pike	6518	.130	JUN 25 2:00 PM	.112	JUN 26 2:00 PM	.102	JUN 24 2:00 PM	.095	AUG 14 1:00 PM	1	
FAIRFAX CO. L-46-F Upper Cub Run Sewage Treatment Plant	6476	.108	JUN 25 2:00 PM	.094	AUG 28 5:00 PM	.093	JUN 26 1:00 PM	.089	JUN 24 5:00 PM	0	

**VIRGINIA 2003**  
**OZONE SUMMARY BY REGION**  
**METHOD 19 - INSTRUMENTAL ULTRAVIOLET**  
**Parts Per Million (ppm)**  
**Ozone Season - April through October**

LOCATION/ STATION NO.	NO. DAILY OBS.	NUMBER OF DAILY MAXIMUM 1-HOUR CONCENTRATIONS IN RANGES								
		.00 to .04	.05 to .08	.09 to .12	.13 to .16	.17 to .20	.21 to .24	.25 to .28	>.28	
<b>SOUTHWEST REGION</b>										
WYTHE CO. 16-B Rural Retreat Sewage Disposal	210	43	163	4	0	0	0	0	0	0
<b>WEST CENTRAL REGION</b>										
ROANOKE CO. 19-A6 East Vinton Elementary School	213	65	146	2	0	0	0	0	0	0
<b>VALLEY REGION</b>										
ROCKBRIDGE CO. 21-C Natural Bridge	213	75	136	2	0	0	0	0	0	0
FREDERICK CO. 28-J Rest	214	72	138	4	0	0	0	0	0	0
PAGE CO. 29-D Luray Caverns Airport	214	62	146	6	0	0	0	0	0	0
<b>PIEDMONT REGION</b>										
CHARLES CITY CO. 75-B Route 608	203	57	138	7	1	0	0	0	0	0
CHESTERFIELD CO. 71-H Beach Road	202	65	130	7	0	0	0	0	0	0
HENRICO CO. 72-M Math and Science Center	205	63	132	10	0	0	0	0	0	0
HANOVER CO. 73-E McClellan Road	202	47	144	11	0	0	0	0	0	0

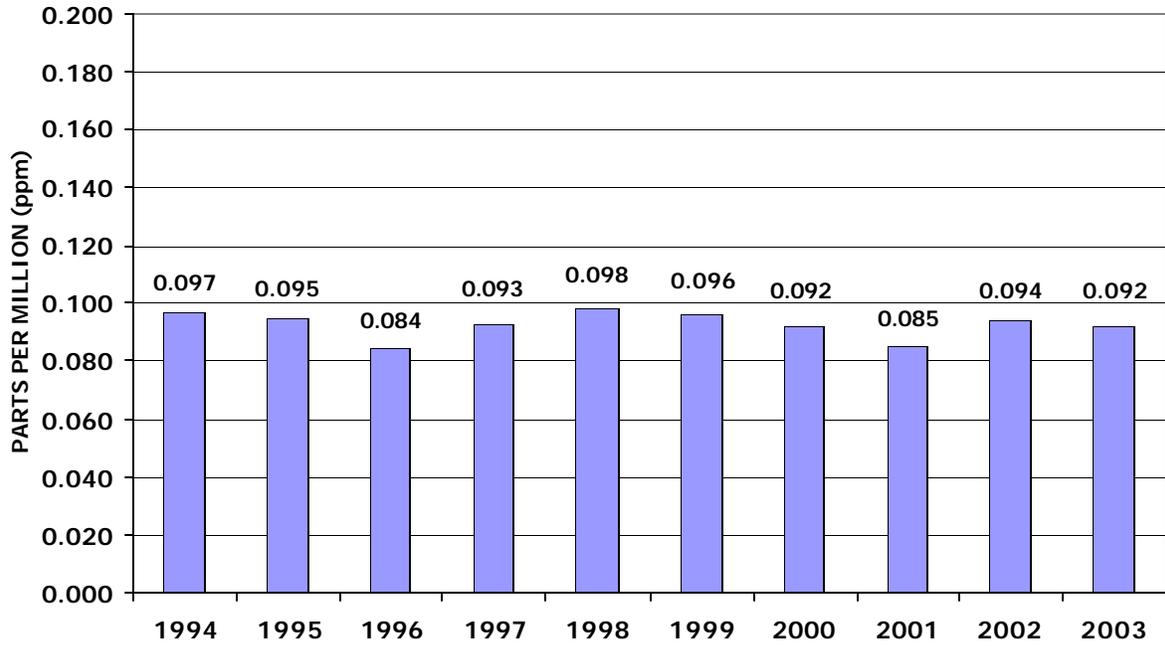
**VIRGINIA 2003  
OZONE SUMMARY BY REGION  
METHOD 19 AND 47 - INSTRUMENTAL ULTRAVIOLET  
Parts Per Million (ppm)  
Ozone Season - April through October**

LOCATION/ STATION NO.	NO. DAILY OBS.	NUMBER OF DAILY MAXIMUM 1-HOUR CONCENTRATIONS IN RANGES								
		.00 to .04	.05 to .08	.09 to .12	.13 to .16	.17 to .20	.21 to .24	.25 to .28	>.28	
<b>TIDEWATER REGION</b>										
HAMPTON Virginia School	179-C	210	60	144	5	1	0	0	0	0
SUFFOLK Tidewater Comm. College	183-E	208	53	147	7	1	0	0	0	0
SUFFOLK Tidewater Research Station	183-F	212	57	149	6	0	0	0	0	0
<b>NORTHERN REGION</b>										
ARLINGTON CO. Aurora Hills Fire Station	47-T	206	82	111	12	1	0	0	0	0
CAROLINE CO. U.S.G.S. Geomagnetic Center	48-A	208	56	144	8	0	0	0	0	0
FAUQUIER CO. Phelps Wildlife Area	37-B	210	85	122	3	0	0	0	0	0
FAIRFAX CO. Lee District Park	46-B9	205	69	126	9	1	0	0	0	0
LOUDOUN CO. Broad Run High School	38-I	213	71	132	10	0	0	0	0	0

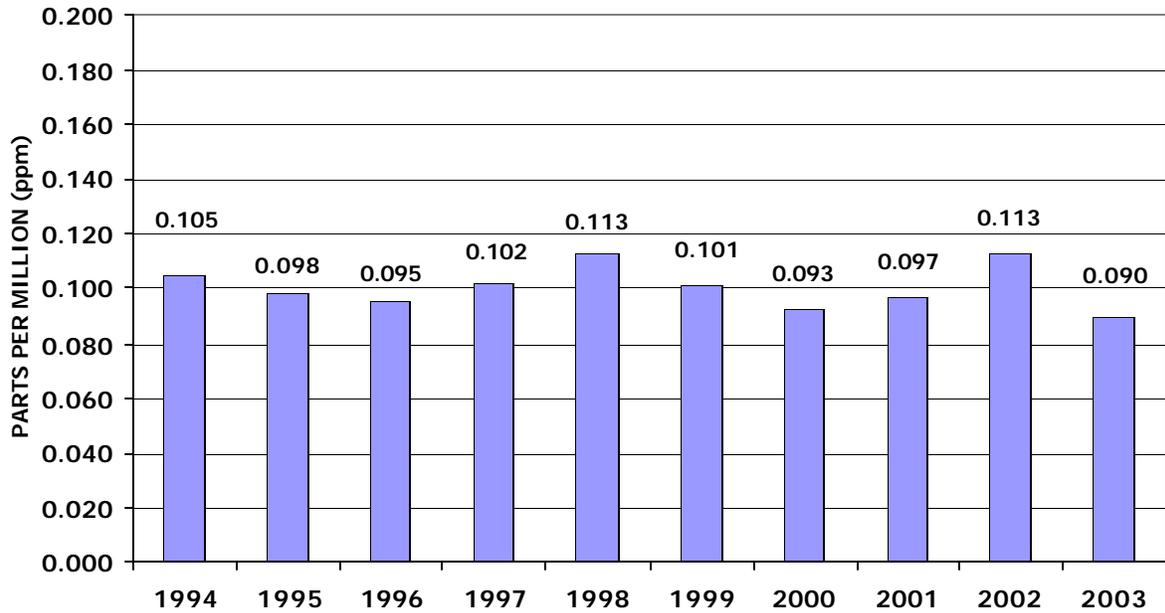
**VIRGINIA 2003  
OZONE SUMMARY BY REGION  
METHOD 19 - INSTRUMENTAL ULTRAVIOLET  
Parts Per Million (ppm)  
Ozone Season - April through October**

LOCATION/ STATION NO.	NO. DAILY OBS.	NUMBER OF DAILY MAXIMUM 1-HOUR CONCENTRATIONS IN RANGES								
		.00 to .04	.05 to .08	.09 to .12	.13 to .16	.17 to .20	.21 to .24	.25 to .28	>.28	
<b>NORTHERN REGION (CONTINUED)</b>										
PRINCE WILLIAM CO. 45-L Long Park	213	72	136	5	0	0	0	0	0	0
STAFFORD CO. 44-A Widewater Elementary School	209	60	141	8	0	0	0	0	0	0
ALEXANDRIA L-126-C 517 North Saint Asaph Street	214	95	109	10	0	0	0	0	0	0
<b>FAIRFAX CO. HEALTH DEPT.</b>										
FAIRFAX CO. L-46-A8 437 Balls Hill Road	204	85	115	4	0	0	0	0	0	0
FAIRFAX CO. L-46-B3 2675 Sherwood Hall Lane	210	73	129	6	2	0	0	0	0	0
FAIRFAX CO. L-46-C1 Mason Governmental Center	213	77	126	9	1	0	0	0	0	0
FAIRFAX CO. L-46-F Upper Cub Run Sewage Treatment Plant	210	70	133	7	0	0	0	0	0	0

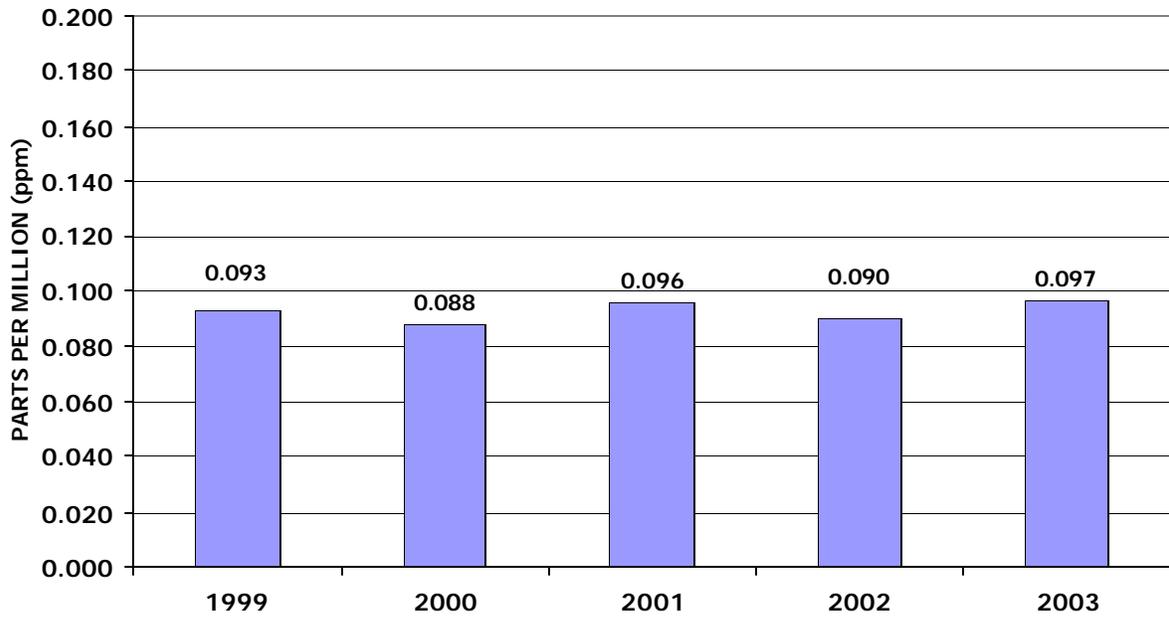
**OZONE, SOUTHWEST REGION**  
**2ND DAILY MAXIMUM, 1-HOUR VALUE**  
**16-B, Rural Retreat, Wythe County**



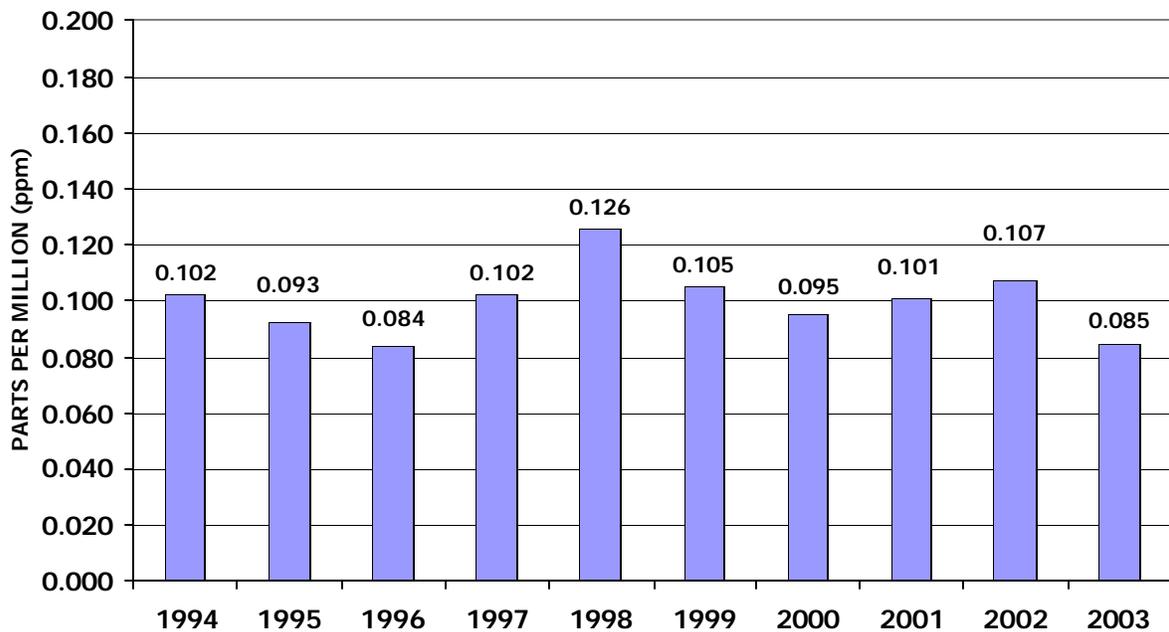
**OZONE, VALLEY REGION**  
**2ND DAILY MAXIMUM, 1-HOUR VALUE**  
**28-J, Rest, Frederick County**



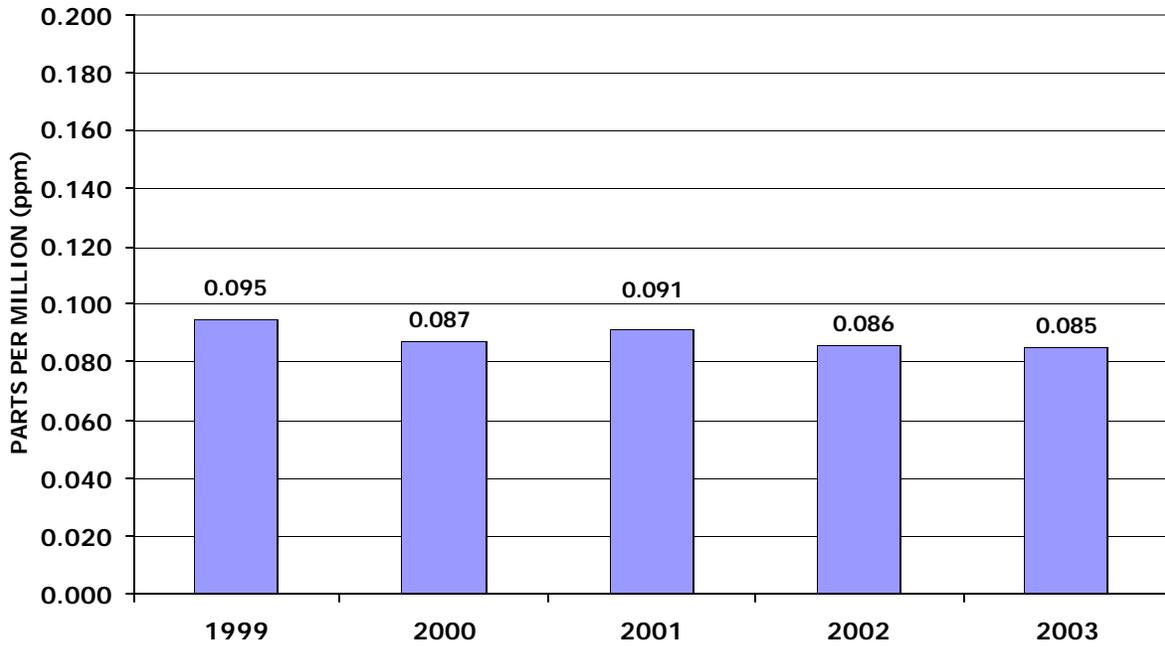
**OZONE, PIEDMONT REGION**  
**2ND DAILY MAXIMUM, 1-HOUR VALUE**  
29-D, Luray Caverns, Page Co.



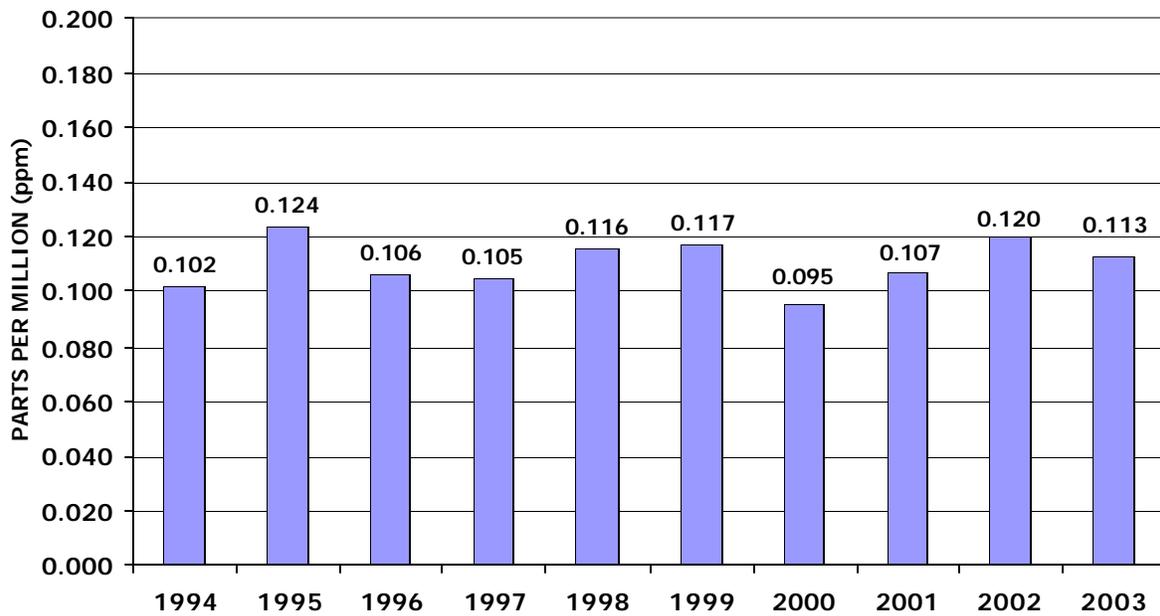
**OZONE, WEST CENTRAL REGION**  
**2ND DAILY MAXIMUM, 1-HOUR VALUE**  
19-A6, Vinton Elementary School, Roanoke Co.



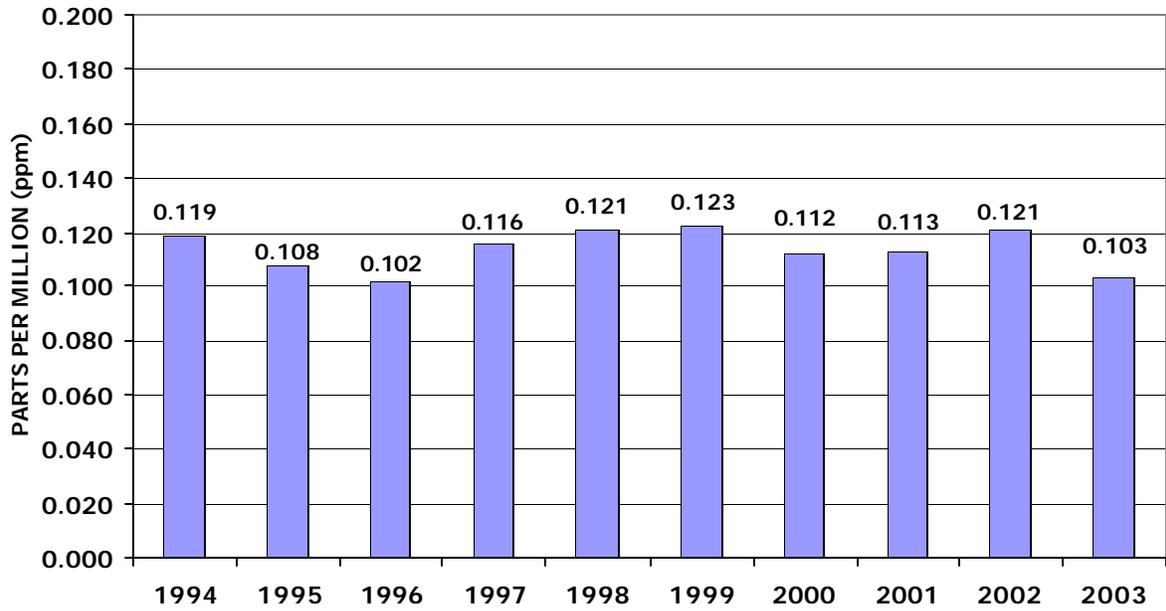
**OZONE, WEST CENTRAL REGION**  
**2ND DAILY MAXIMUM, 1-HOUR VALUE**  
21-C, Natural Bridge Ranger Station, Rockbrige Co.



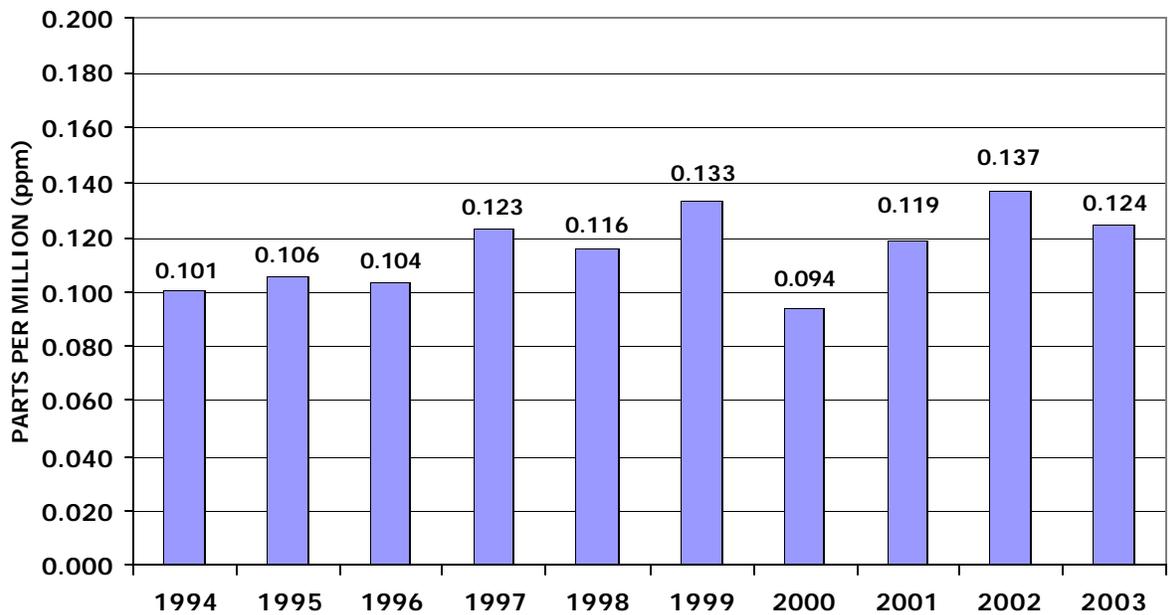
**OZONE, PIEDMONT REGION**  
**2ND DAILY MAXIMUM, 1-HOUR VALUE**  
71-H, Beach Road, Chesterfield County



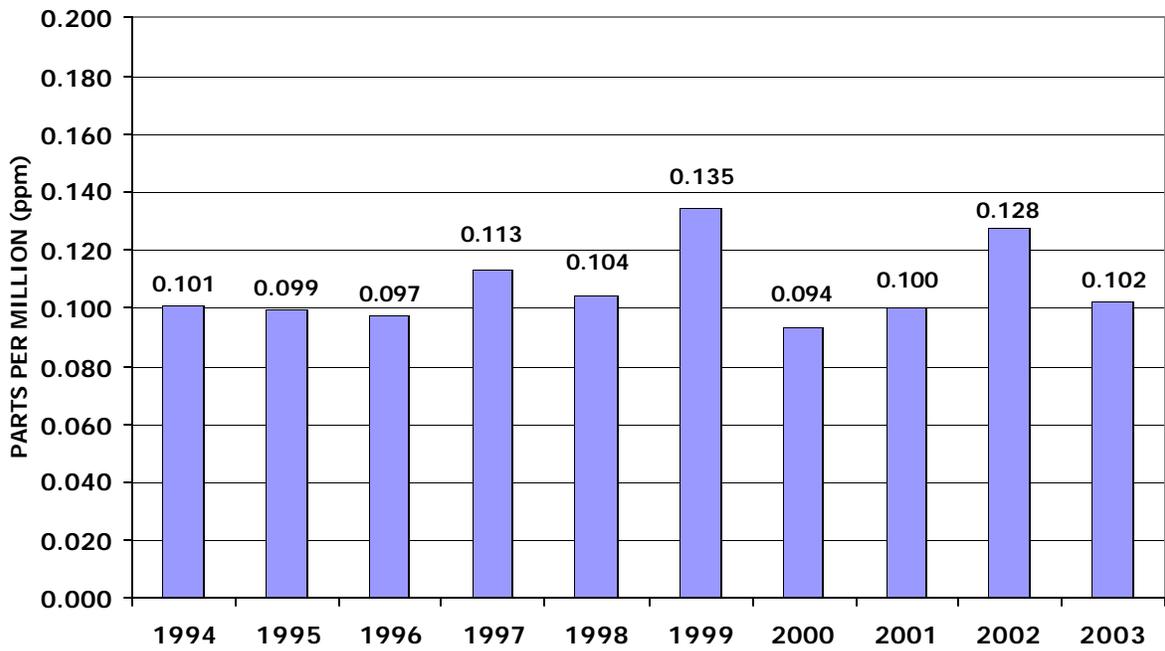
**OZONE, PIEDMONT REGION**  
**2ND DAILY MAXIMUM, 1-HOUR VALUE**  
**72-M, Math & Science Center, Henrico County**



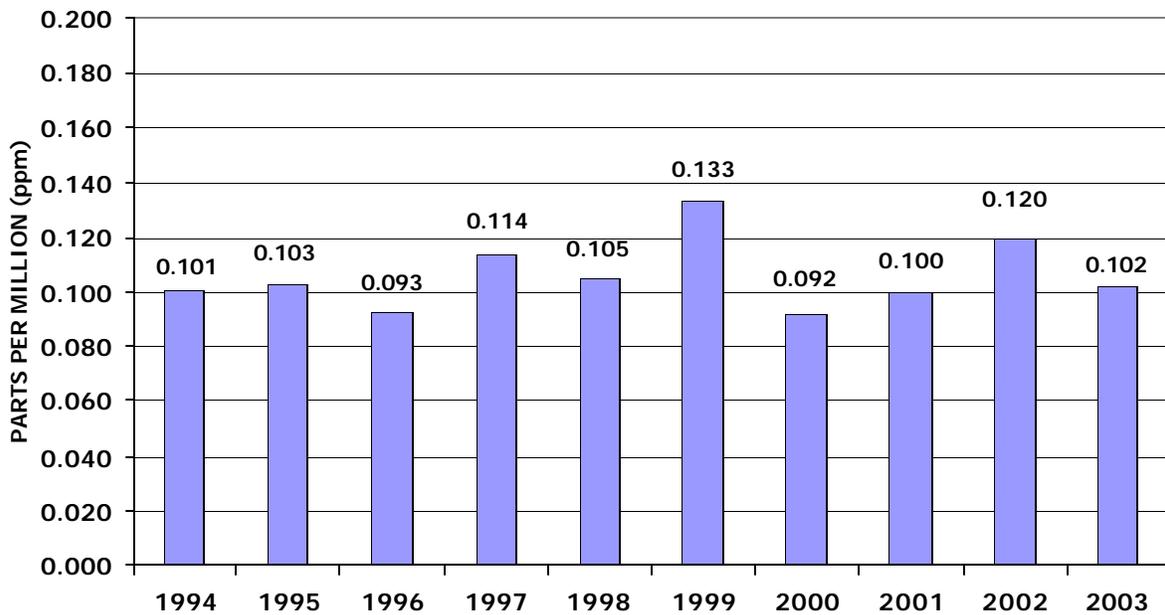
**OZONE, PIEDMONT REGION**  
**2ND DAILY MAXIMUM, 1-HOUR VALUE**  
**75-B, Route 608, Charles City County**



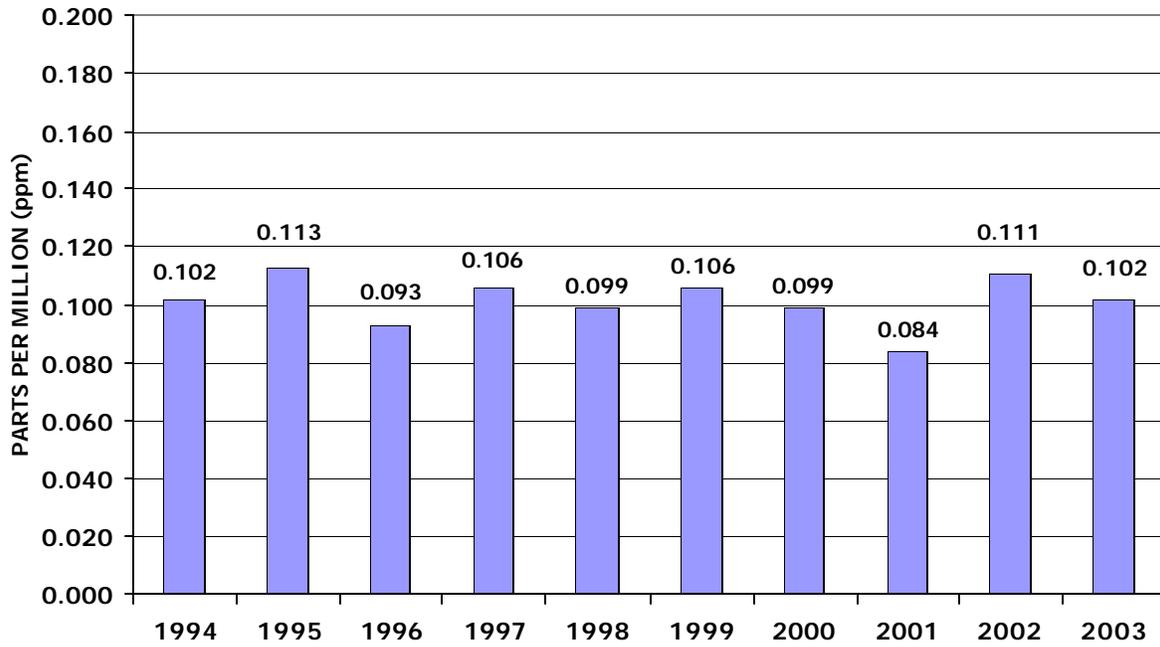
**OZONE, TIDEWATER REGION**  
**2ND DAILY MAXIMUM, 1-HOUR VALUE**  
**179-C, Virginia School, Hampton**



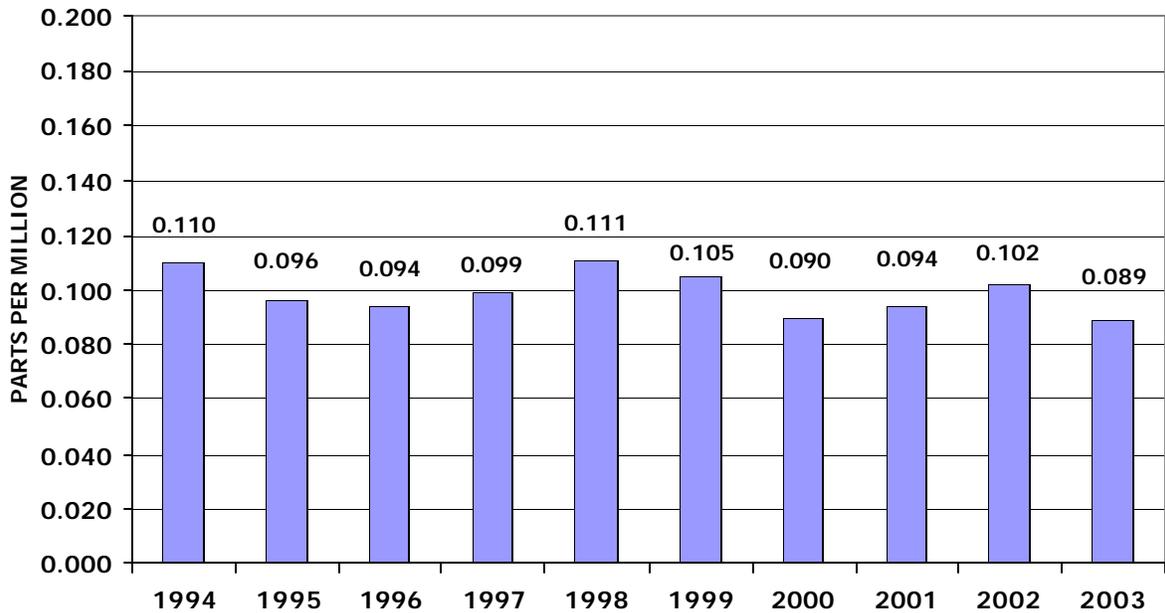
**OZONE, TIDEWATER REGION**  
**2ND DAILY MAXIMUM, 1-HOUR VALUE**  
**183-E, Tidewater Community College, Suffolk**



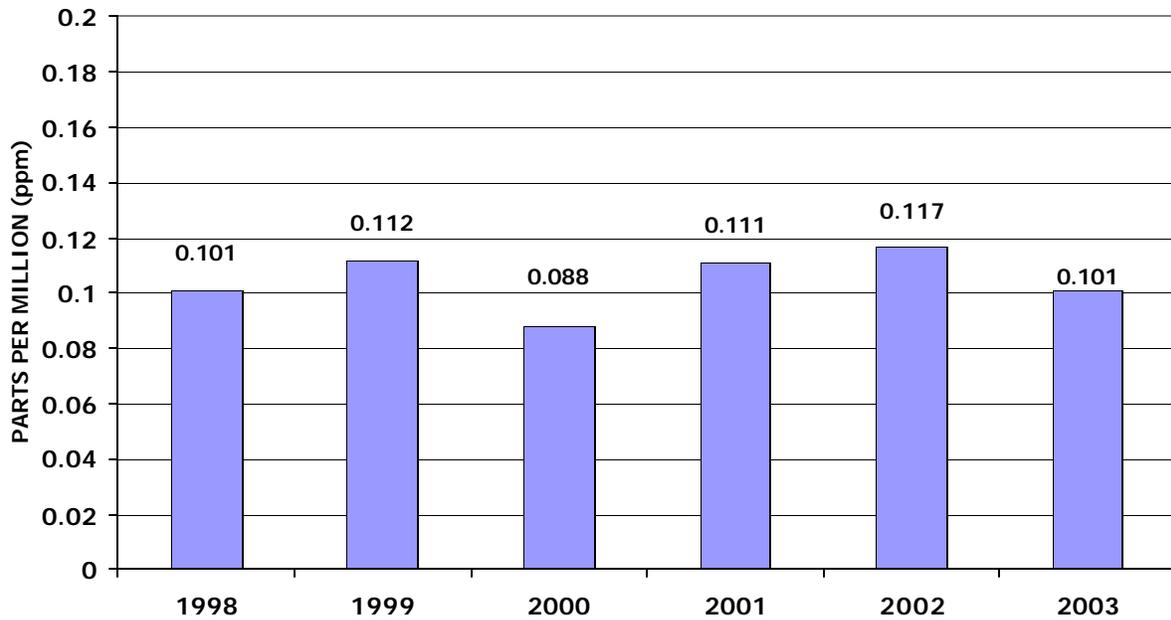
**OZONE, TIDEWATER REGION**  
**2ND DAILY MAXIMUM, 1-HOUR VALUE**  
**183-F, Holland, Suffolk**



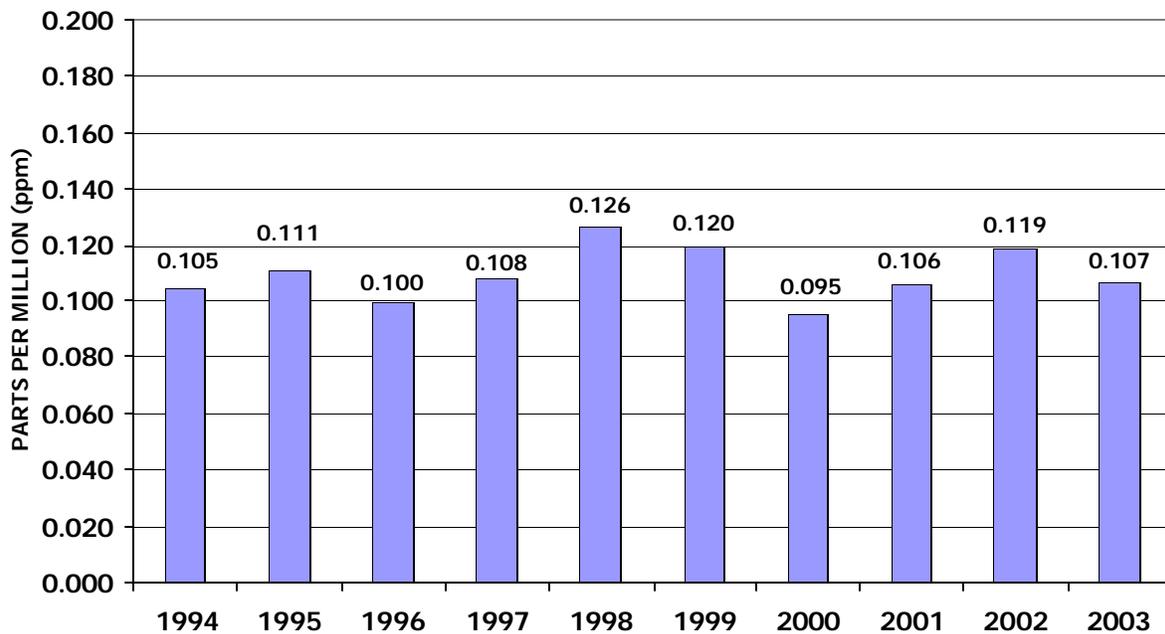
**OZONE, NORTHERN REGION**  
**2ND DAILY MAXIMUM, 1-HOUR VALUE**  
**37-B, Phelps Wildlife Area, Fauquier County**



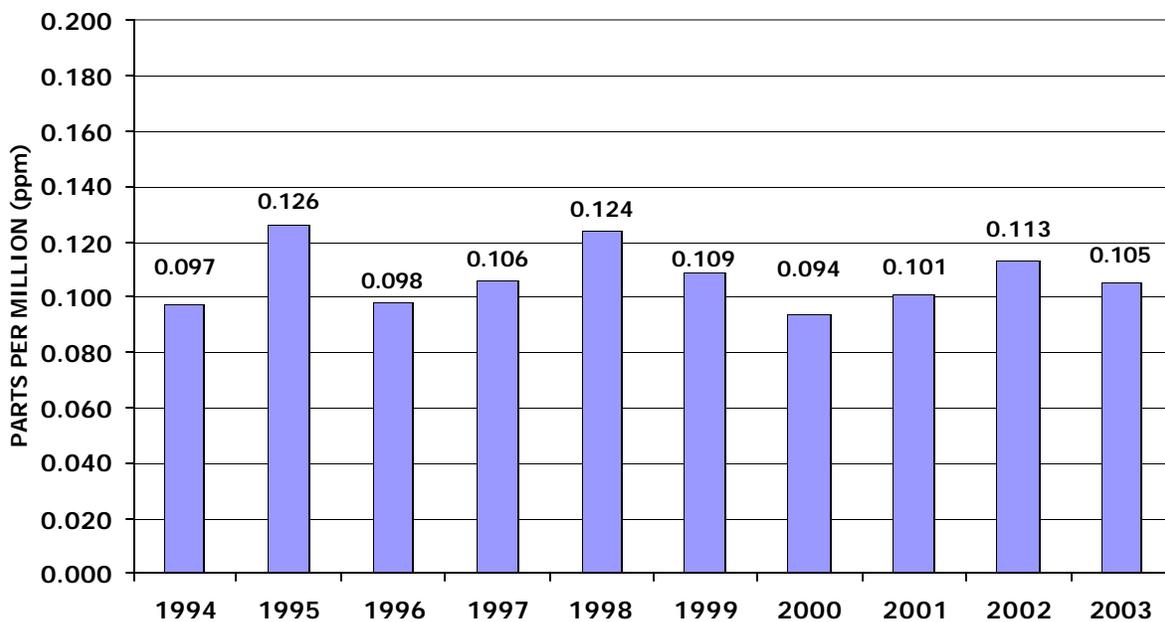
**OZONE, NORTHERN REGION**  
**2ND DAILY MAXIMUM, 1-HOUR VALUE**  
**38-1, Broad Run High School, Ashburn**



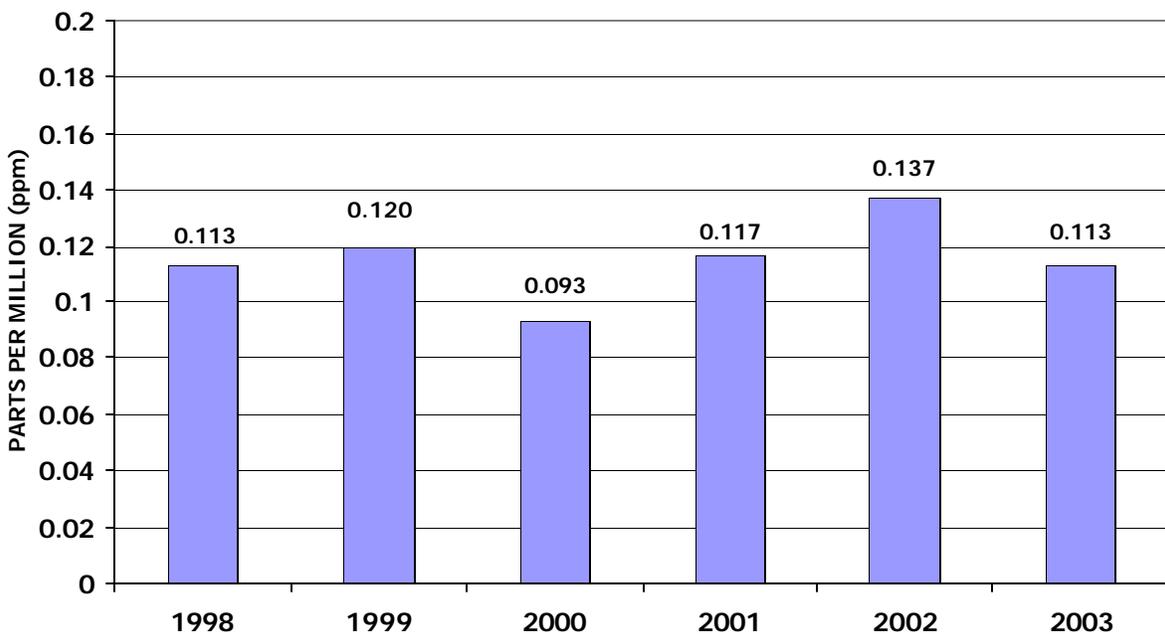
**OZONE, NORTHERN REGION**  
**2ND DAILY MAXIMUM, 1-HOUR VALUE**  
**44-A, Widewater Elementary School, Stafford County**



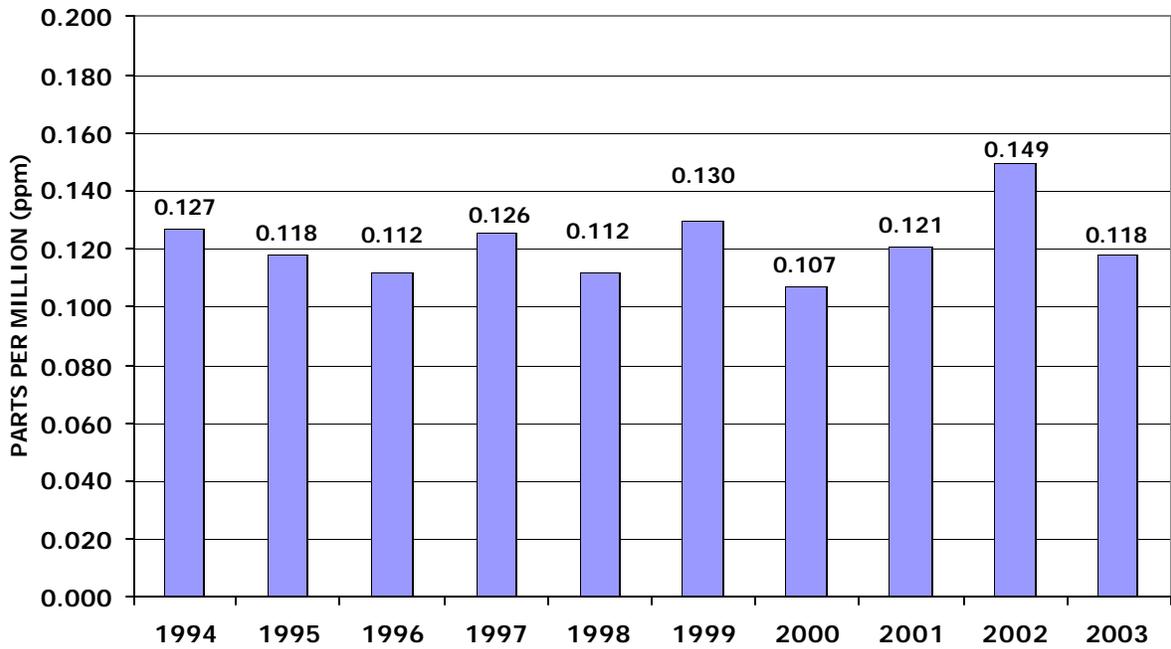
**OZONE, NORTHERN REGION**  
**2ND DAILY MAXIMUM, 1-HOUR VALUE**  
**45-L, Long Park, Prince William County**



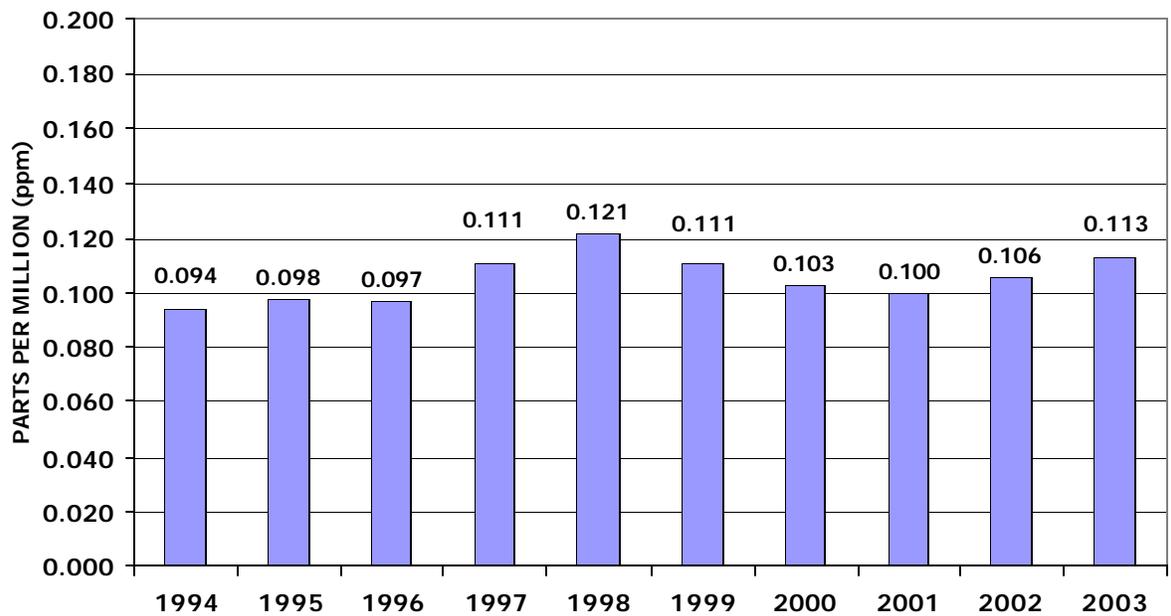
**OZONE, NORTHERN REGION**  
**2ND DAILY MAXIMUM, 1-HOUR VALUE**  
**46-B9, Lee District Park, Fairfax County**



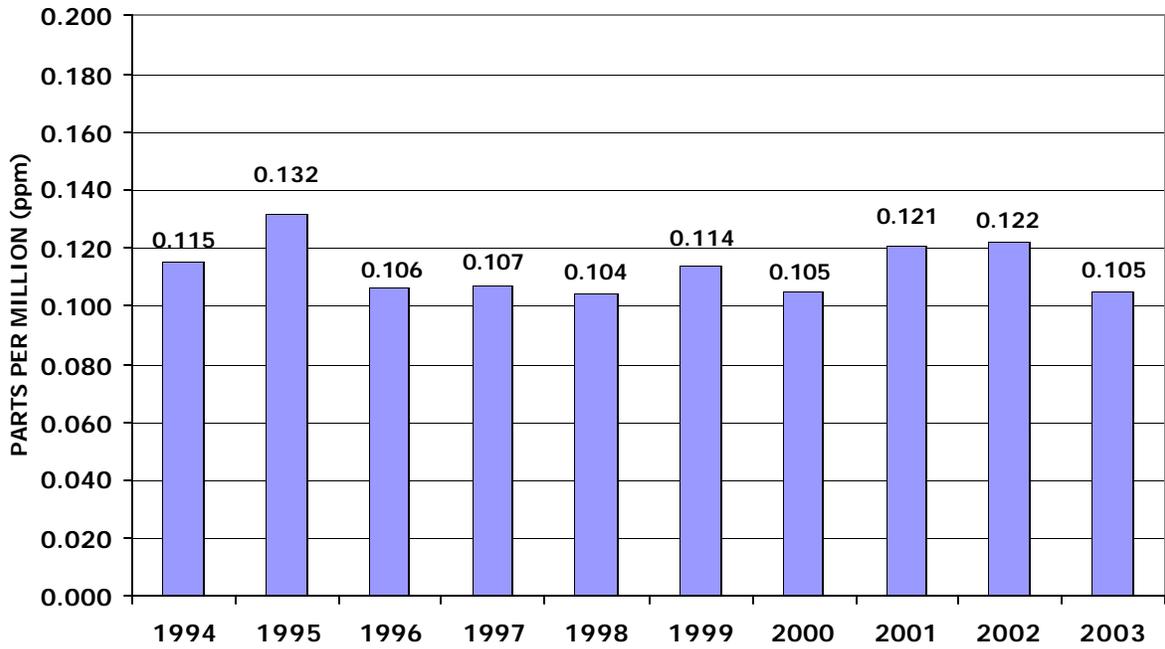
**OZONE, NORTHERN REGION**  
**2ND DAILY MAXIMUM, 1-HOUR VALUE**  
47-T, Aurora Hills Visitors Center, Arlington County



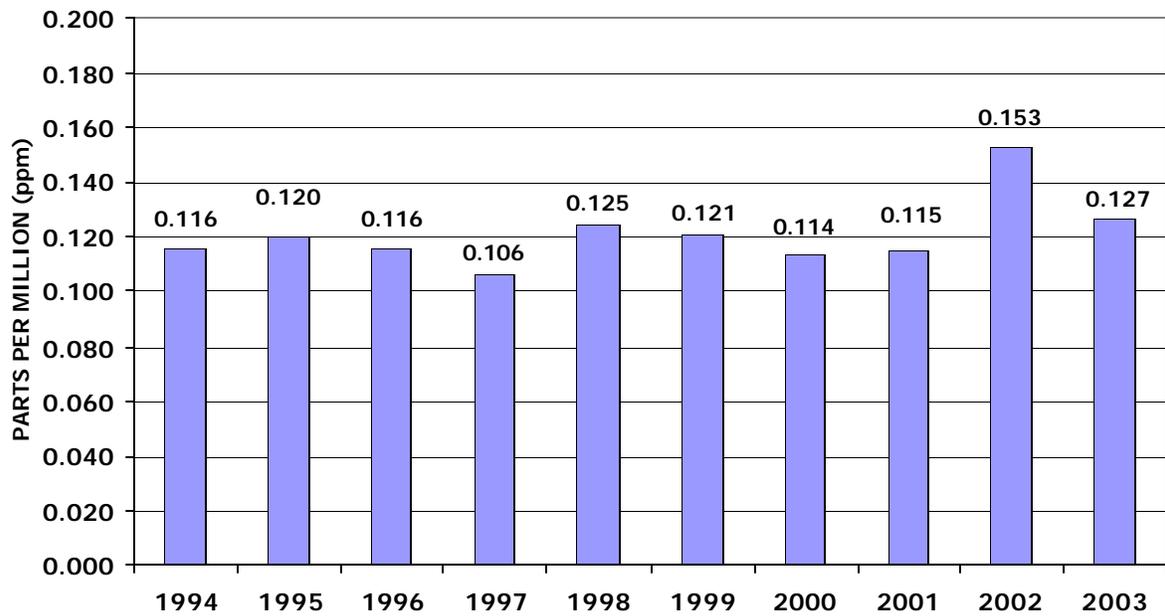
**OZONE, NORTHERN REGION**  
**2ND DAILY MAXIMUM, 1-HOUR VALUE**  
48-A, Corbin, Caroline Co.



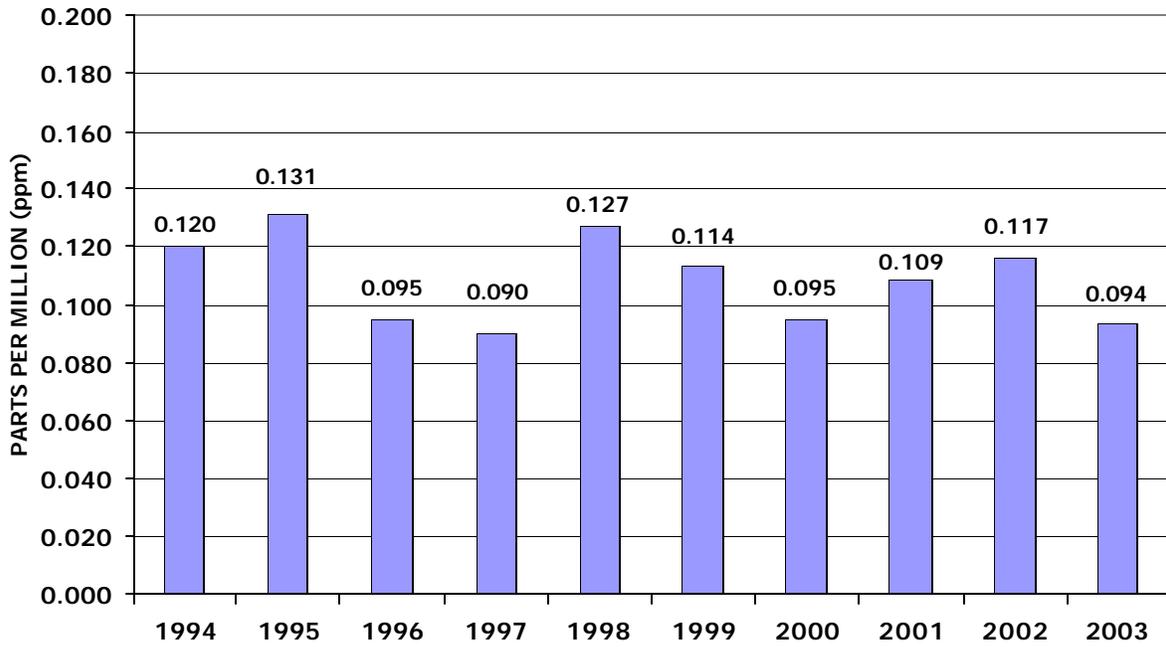
**OZONE, FAIRFAX COUNTY**  
**2ND DAILY MAXIMUM, 1-HOUR VALUE**  
L-46-A8, 1437 Balls Hill Road, McLean



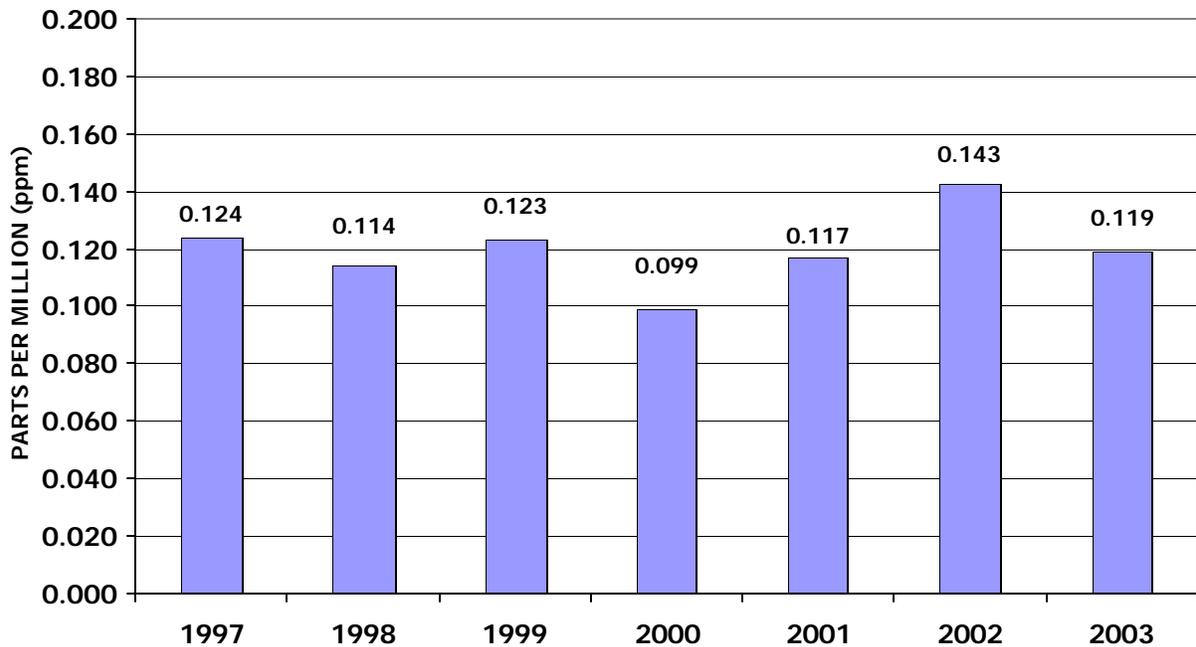
**OZONE, FAIRFAX COUNTY**  
**2ND DAILY MAXIMUM, 1-HOUR VALUE**  
L-46-B3, 2675 Sherwood Hall Lane, Mt. Vernon



**OZONE, FAIRFAX COUNTY**  
**2ND DAILY MAXIMUM, 1-HOUR VALUE**  
**L-46-F, Upper Cub Run Drive, Chantilly**



**OZONE, FAIRFAX COUNTY**  
**2ND DAILY MAXIMUM, 1-HOUR VALUE**  
**L-126-C, 517 North Saint Asaph St., Alexandria**



**2003 VIRGINIA  
OZONE EIGHT YEAR TREND  
NUMBER OF DAYS WITH 1-HOUR AVERAGE CONCENTRATIONS > 0.12 ppm**

REGION/LOCATION	STATION NUMBER	1996	1997	1998	1999	2000	2001	2002	2003
<b>SOUTHWEST REGION</b>									
WYTHE CO., Rural Retreat	16-B	0	0	0	0	0	0	0	0
<b>VALLEY REGION</b>									
ROCKBRIDGE CO., Natural Bridge Ranger Station	21-C	--	--	--	0	0	0	0	0
FREDERICK CO., Rest	28-J	0	0	0	0	0	0	0	0
PAGE CO., Luray Caverns Airport	29-D	--	--	--	0	0	0	0	0
<b>WEST CENTRAL REGION</b>									
ROANOKE CO., Vinton	19-A6	0	0	2	0	0	0	0	0
<b>PIEDMONT REGION</b>									
CHARLES CITY CO., Route 608	75-B	0	1	1	5	0	0	3	1
CHESTERFIELD CO., Beach Road	71-H	0	0	0	0	0	0	1	0
HENRICO CO., Math & Science Center	72-M	0	1	1	1	0	1	1	0
HANOVER CO., McClellan Road	73-E	--	--	--	--	--	0	1	0
<b>TIDEWATER REGION</b>									
HAMPTON, Va. School for the Deaf & Blind	179-C	0	0	0	3	0	0	2	1
SUFFOLK, Tidewater Community College	183-E	0	0	0	3	0	1	1	1
SUFFOLK, Tidewater Research Station	183-F	0	0	0	0	0	0	0	0

**2003 VIRGINIA  
OZONE EIGHT YEAR TREND  
NUMBER OF DAYS WITH 1-HOUR AVERAGE CONCENTRATIONS > 0.12 ppm**

REGION/LOCATION	STATION NUMBER	1996	1997	1998	1999	2000	2001	2002	2003
<b>NORTHERN REGION</b>									
<b>FAUQUIER CO.</b> , Phelps Wildlife Area	37-B	0	0	0	0	0	0	0	0
<b>LOUDOUN CO.</b> , Broad Run High School	38-I	--	--	0	0	0	0	1	0
<b>STAFFORD CO.</b> , Widewater Elementary School	44-A	0	0	2	1	0	0	1	0
<b>PRINCE WILLIAM CO.</b> , Long Park	45-L	0	0	1	0	0	0	1	0
<b>FAIRFAX CO.</b> , Lee District Park	46-B9	--	--	0	1	0	0	4	1
<b>ARLINGTON CO.</b> , Aurora Hills Visitors Center	47-T	0	2	0	2	0	0	4	1
<b>CAROLINE CO.</b> , U.S.G.S. Geomagnetic Center	48-A	0	0	1	0	0	0	0	0
<b>ALEXANDRIA</b> , 517 North St. Asaph Street	L-126-C	0	1	0	1	0	0	3	0
<b>FAIRFAX COUNTY</b>									
<b>FAIRFAX CO.</b> , McLean Governmental Center, 1437 Balls Hill Road	L46-A8	0	0	0	1	0	1	1	0
<b>FAIRFAX CO.</b> , Mt. Vernon Fire Station, 2675 Sherwood Hall Lane	L-46-B3	1	0	2	1	1	0	3	2
<b>FAIRFAX CO.</b> , Annandale Mason Governmental Center	L-46-C1	--	--	--	--	--	--	2	1
<b>FAIRFAX CO.</b> , Upper Cub Run, Chantilly	L-46-F	0	0	2	0	0	0	1	0
<b>TOTAL</b>		<b>1</b>	<b>5</b>	<b>12</b>	<b>19</b>	<b>1</b>	<b>3</b>	<b>30</b>	<b>8</b>

## 2003 OZONE 1-HOUR AVERAGE CONCENTRATIONS > 0.12 PPM

REGION	STATION	LOCATION	EXCEEDANCE VALUE (PPM)	DATE	TIME (EST)
Piedmont	75-B	<b>Charles City Co.</b> , Route 608	0.140	6/26/03	1:00 pm
Tidewater	179-C	<b>Hampton</b> , Virginia School	0.136	6/26/03	Noon
	183-E	<b>Suffolk</b> , Tidewater Community Coll.	0.125	6/26/03	1:00 pm
Northern	47-T	<b>Arlington Co.</b> , Aurora Hills Visitors Center	0.126	6/25/03	3:00 pm
	46-B9	<b>Franconia</b> , Lee District Park	0.137	6/25/03	2:00 pm
	L-46-B3	<b>Fairfax Co.</b> , 2675 Sherwood Hall Lane	0.132	6/25/03	2:00 pm
			0.127	8/14/03	3:00 pm
L-46-C1	<b>Fairfax Co.</b> , Mason Governmental Center	0.130	6/25/03	2:00 pm	

## References

Code of Federal Regulations - 40 CFR 58 - Appendix F

Virginia Ambient Air Monitoring Data Reports

"Guideline for the Interpretation of Air Quality Standards"

U.S. Environmental Protection Agency  
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Research Triangle Park, N.C. 27711, OAQPS No.1.2-009

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U.S. Environmental Protection Agency  
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Statistical Evaluation Methods for Air Pollution Data  
Atmospheric Sampling